Modern Refrigeration & Air Control

61 No. 719 FEBRUARY, 1958 Price 2s. 6d. monthly

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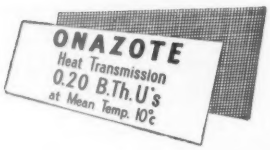

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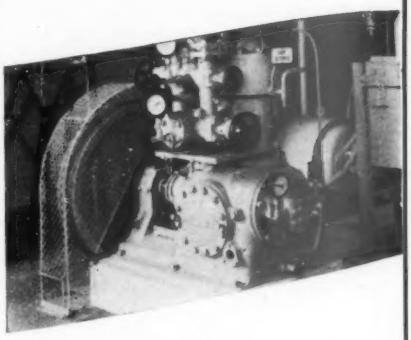

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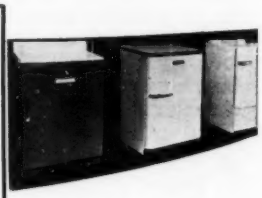

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VOLUME 61 NUMBER 719

February . 1958

Editorial . . . .

The Institute's Presidency

Refrigeration in Denmark

Trade Missions

● Our " picture of the month " on page 133 calls for very special comment. We should like it to serve as our mark of respect for and congratulation to the gentleman on the left of the illustration—Lieut.-Col. Lord Dudley G. Gordon, D.S.O., LL.D., who soon completes two years as president of The Institute of Refrigeration. How wisely the fortunes of the society have been guided during that period most members know full well but many may not recall that Col. Gordon served an equally energetic presidency in 1928. We are ready to admit that some of our younger readers will find it difficult to realize, after they have studied this portrait, that as many as 30 years could have elapsed between the two terms of office, so lightly has time touched our retiring president. If we may be permitted a personal word here, may we say that we, among many others in the industry, have long regarded Col. Gordon as a fine example of business integrity allied to an outstanding personal character.

● The newly-chosen president of The Institute, Sir Rupert de la Bère, Bart, K.C.V.O., is no stranger to its members, quite apart from the fact that he will be remembered for his brilliant lord-mayoralty of London and for his direction of the affairs of the great commercial enterprise that stretches almost all the way from London Bridge to Tower Bridge, on the south bank of The Thames. For the last four years he has been a most popular guest at the society's annual banquet and has enlivened the toast list on each occasion. Sir Rupert will not be officially in touch with members until the autumn but in the meantime we will wish our new president a happy term of office.

● While visiting manufacturing and freezing establishments in Denmark last month the writer was able to find out that arrangements for the Xth International Congress of Refrigeration in 1959 are well in hand. We print on another page the first published details of the composition of the several committees which will handle this great event in Copenhagen. Many of the members of committee will be known to our readers but, in any event, it will be our pleasure to introduce them, through our columns, in the months ahead.

● There is much of interest to be seen, industrially and otherwise, in Denmark at the moment. Outside Copenhagen is one of the most modern dry ice plants in Europe which has an efficiency second to none. It was enlightening to learn that Denmark's " consumption " of dry ice, *per capita*, is larger than that of Great Britain. The vehicles that make the long hauls of produce down to Austria and Italy absorb a large quantity of this material. Also worthy of mention is a new freezing plant up in the north of Jutland, at Aalborg, that handles up to 25 tons of meat a day in the blast-freezer. The automatic packing line for pre-cut meats includes a 60-ft. conveyor and several 20-ft. conveyor tables. The standard of hygiene in this factory we have not seen surpassed. Well over 60 different retail packed items are produced and a similar number of portion-control meats.

● However well British industry has responded to the call to send top representatives overseas to sell, the arrival at these shores of more and more trade missions is most gratifying to manufacturers. It is only to be hoped that full benefit is derived from the presence of these buyers while they are with us. It will be recalled by readers that an impressive meeting was held by the Canadian trade mission at the Federation of British Industries' headquarters recently when members of the Canadian trade mission met trade organizations and associations of this country, among whom were representatives of the Electrical Engineers (A.S.E.E.) Exhibition Ltd. Members met the Hon. Gordon Churchill, Canadian Minister of Trade and Commerce, also Mr. J. S. Duncan, C.M.G., chairman of the Dollar Sterling Trade Council and chairman Hydro-Electric Power Commission of Ontario who was deputy leader ; Mr. Kenneth F. Fraser, vice-president of B.C. Packers Ltd., and Mr. David M. Woods, president of Gordon Mackay Ltd. The mission stated they were very impressed with the modernization and improvements that they had seen in factories during their visit compared with the last time they were in this country. They remarked that the design, skill and efficiency were very good. It was also stated that although large companies were generally well represented in Canada they would like to see more of the smaller organizations' products with modern design and colourings but not high priced materials. They would like to meet our buyers more often but we must understand that they did not always want what we showed but would like us to consider their own problems and produce equipment to suit. Many

questions were asked the mission concerning electrical equipment, electronics, automation and radio. Mr. J. H. K. Pendry, Mr. E. A. Bromfield, secretary, and Mr. P. A. Thorogood, general manager, then had the opportunity of inviting Canadian engineers to visit the exhibition in March.

● We now learn that a Queensland promotion delegation is expected to arrive in London in early April and to remain in the United Kingdom for a period of several weeks. While in this country the delegation will visit the main industrial centres. The party, which is being led by the Queensland Deputy Premier and Minister for Labour and Industry (Mr. K. J. Morris, M.L.A.) will draw attention to Queensland industry and plans for future development with a view to attracting British industry with ideas of oversea expansion. In addition it will survey the field of permits for manufacture in Queensland under licence. Apart from the leader Mr. Morris, who has had wide experience in the commercial world the members are Mr. Leon Trout, F.A.S.A. (deputy leader), and federal president of the Associated Chambers of Commerce of Australia. Mr. Trout is the director of several manufacturing and commercial firms ; Mr. W. A. Gunn, C.M.G., president of the United Graziers' Association of Queensland—Mr. Gunn is a grazier and a member and officer of many primary producing organizations and a member of the Commonwealth Bank Board ; Mr. D. W. Garland, chief inspector of the Bank of New South Wales, who has had a long and extensive career in banking in Queensland ; Mr. J. R. L. Hyne, managing director of one of the largest sawmilling firms in Queensland and director of a large engineering and a merchandising establishment ; Mr. Bruce Shearer, chairman of directors of the Colonial Mutual Life Assurance Society Ltd. and chairman of directors or a director of many other merchandising and manufacturing establishments. Mr. Shearer is a man with many public interests and is the chairman of the Brisbane Development Association ; Mr. T. B. F. Gargett, Fellow of the Royal Institute of British Architects and Fellow (and Federal Councillor) of the Royal Australian Institute of Architects. Mr. Gargett is one of the leading architects in Queensland.

● The merging of two giants in the metal industry so widely called upon by the refrigeration trade has been one of the talking points these last few weeks. Yorkshire Imperial Metals Ltd. is the new company which represents the fusion of the copper and alloy tube, fittings and plate activities of the Yorkshire Copper Works Ltd. and of Imperial Chemical Industries Ltd. The new company disposes of assets worth about £18,000,000 including the former I.C.I. plants at Kirkby (Liverpool), Smethwick (Staffs), Landore (Swansea), and Dundee, and the former Yorkshire Copper plants at Leeds, Barrhead (Glasgow), and Castleford (Yorks). The registered office of Yorkshire Imperial Metals Ltd. is at Haigh Park Road, Leeds. The board of directors has been constituted as follows : *From I.C.I.*—Dr. James Taylor (chairman), Peter T. Menzies, Dr. Maurice Cook, Michael J. S. Clapham, St. John Elstub, Harold Royle and Walter N. Ismay. *From Yorkshire Copper*—George P. Norton (deputy chairman), H. F. Sherbourne (managing), W. R. D. Macdonald, C. G. Robinson, Donald Fraser, J. Christie, Clifford Breckon. The company's secretary is P. D. Peel Yates.

● In conjunction with the annual conference of the Australian Institute of Refrigeration Incorporated, a comprehensive exhibition of Australian refrigeration machines and materials, air-conditioning plant, cold storage, food preservation and distribution, ice and ice-making will be held in the Hordern pavilion, R.A.S. Showgrounds, Sydney, from May 6 to 10. The convention will consist of a series of lectures, and the guest speakers will be Professor Rudolf Plank of Karlsruhe, Germany, and Mr. George F. Taubeneck of Detroit, Michigan, U.S.A. Bringing together for the first time in the South Pacific all people interested in this great industry, the exhibition and convention should advance the knowledge and stimulate the interest of all concerned with buying and selling, and in the technical developments in Australia in food preservation, process and comfort air-conditioning, and will effectively demonstrate the products of all of the leading companies who are already taking up floor space in the exhibition. Hotel equipment will be demonstrated in a modern hotel bar exhibit, and working machinery will supplement feature displays of basic materials used in the manufacture of these. Leaders in the technical and merchandising departments of companies and associations are likely to have persons attending, and the event will bring together purchasing officers and company executives as well as promoting the sales of Australian equipment at home and abroad. The public will be encouraged to visit the exhibition and will be admitted free.

● Sales of Frigidaire equipment reached an all-time record in 1957, announced Mr. A. W. Porter, director and general manager, at last month's sales convention in London. The year had begun in an atmosphere of gloom—Suez crisis, petrol rationing, credit squeeze—but in spite of everything the Frigidaire team had done a wonderful job.

NEWS OF THE MONTH

Refrigeration and A-c. Exports.—During December 1957 air-conditioning and refrigerating machinery (commercial and industrial sizes) to the value of £990,130 weighing 1,466 tons, was exported from the United Kingdom. Comparable figures for December 1956 were 1,224 tons, worth £758,841.

* * *

Exports' Analysis.—Of the 1,466 tons of air-conditioning and refrigerating plant worth £990,130 exported by Great Britain in December—quoted in the preceding paragraph—149 tons went to the Union of South Africa, 126 tons to India, 82 tons to Australia, 93 tons to New Zealand, 92 tons to Canada, 222 tons to " other Commonwealth countries," 22 tons to Eire, 12 tons to Sweden, 36 tons to Western Germany, 66 tons to the Netherlands, 21 tons to Belgium, 22 tons to France, 132 tons to Italy, and 391 tons to " other foreign countries."

* * *

Refrigeration Plant Classified.—Of the total exports of air-conditioning and refrigerating machinery during December, quoted in the first paragraph, automatic power-operated refrigerating machinery accounted for 78 tons, worth £52,771, automatic heat-operated equipment for 20 tons worth £12,482, and non-automatic refrigerating machinery, including parts, for 272 tons, worth £139,409. Parts for all automatic power-operated machinery, weighting 735 tons, were valued at £568,329.

* * *

Exports of Small Refrigerators.—During December, 1,008 tons of complete refrigerators (including complete mechanical units) of a storage capacity not exceeding 12 c.ft. were sent overseas from Great Britain. These exports were worth £590,507. The 1,008 tons comprised 111 tons to the Union of South Africa, 22 tons to Rhodesia and Nyasaland, 20 tons to India, 3 tons to Australia 6 tons to New Zealand, 419 tons to " Other Commonwealth countries," 12 tons to Sweden, 148 tons to Western Germany, 2 tons to the Netherlands, 17 tons to Belgium, 1 ton to Italy, and 246 tons to " other foreign countries."

* * *

B.R.A. Luncheon.—The British Refrigeration Association has announced that arrangements are being made for its annual luncheon to take place on Friday, March 28, at the Connaught Rooms, Great Queen Street, Kingsway, London, W.C.2. The Rt. Hon. Lord Mills, K.B.E., Minister of Power, has accepted an invitation to attend. Presiding will be Mr. D. S. Carruthers (L. Sterne & Co. Ltd.), chairman of the Association.

* * *

Frozen Egg Expansion.—An expansion of the frozen egg trade is anticipated as a result of the recent organization of the Egg Marketing Board. Present indications are that the new body, now some six months old, will tackle the problem of periodic surplus supplies in the light of withdrawal of these extra eggs from the consumer market and their redirection into the catering and baking industry channels. This would have the effect of eliminating blockages in the consumption system and making way for further production ; in effect expanded production of frozen eggs would level out excess production at peak periods without returning these eggs to compete with later supplies. Present indications are that the authorities responsible for this work will use existing trade units for the handling of this business rather than set up its own machinery. But this will impose a very strict responsibility on the board and on the contractors since they will, in effect, be responsible for the efficient and effective maintenance of a quality reputation and will be obliged to work to the most critical standards.

A general view of the new ice cream depot opened by T. Wall & Sons (Ice Cream) Ltd., in Glaisdale Drive, Nottingham. Replacing former premises at Castle Boulevard, Nottingham, the depot has storage facilities for more than 21,000 gallons of ice cream.

New Meat Depot at Torquay.—A few weeks ago the Mayor of Torquay opened a new depot for the Exeter and District Meat Trading Association. The chairman of the Association said that the purpose of the depot was to supply butchers in Torquay and the surrounding area, and because of it stock could go by the shortest possible route from producer to consumer. The depot, which is Prestcold equipped, is claimed to be one of the most modern installations in south-west England. Consisting of a large main hall, which itself can hold many tons of meat, the frozen meat and chiller rooms are provided at either end, details of which make impressive reading. The frozen meat room is of approximately 3,500 c.ft. capacity and designed to be cooled to a temperature of 15° to 20° F. The chiller room is even larger, being approximately 5,800 c.ft., and designed to be cooled to a temperature of 28° to 32° F. This gives a total of over 9,000 c.ft. of refrigerated storage space. One feature of this ultra modern meat depot is the ingenious overhead meat track system, permitting carcases to be moved to any point in the building with the minimum of handling and effort. The other prominent feature is the business-like arrangement of the refrigeration plant installed by Prestcold distributors, W. J. Allsop & Son Ltd. The Prestcold equipment is fully automatic and incorporates hot gas defrosting.

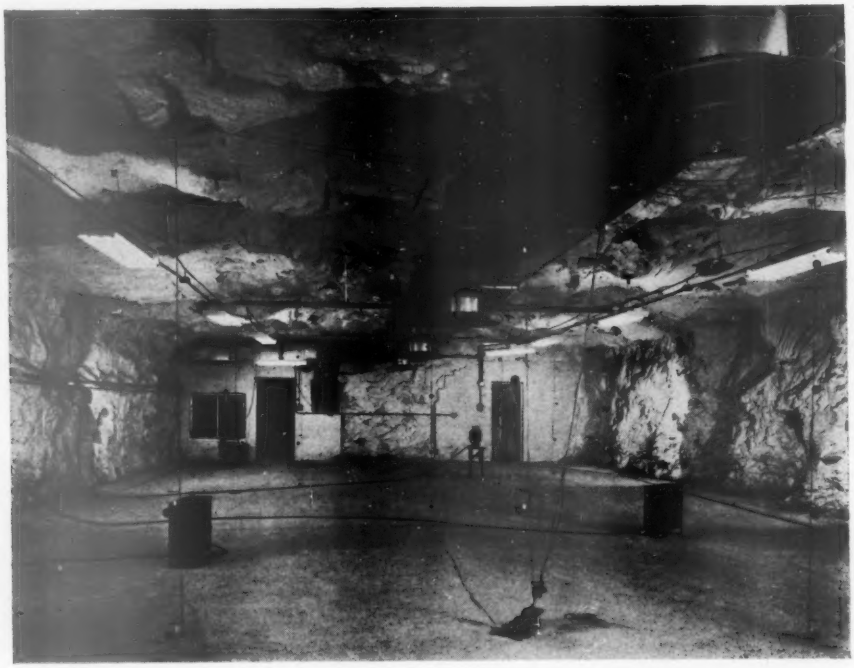
PICTURE OF THE MONTH

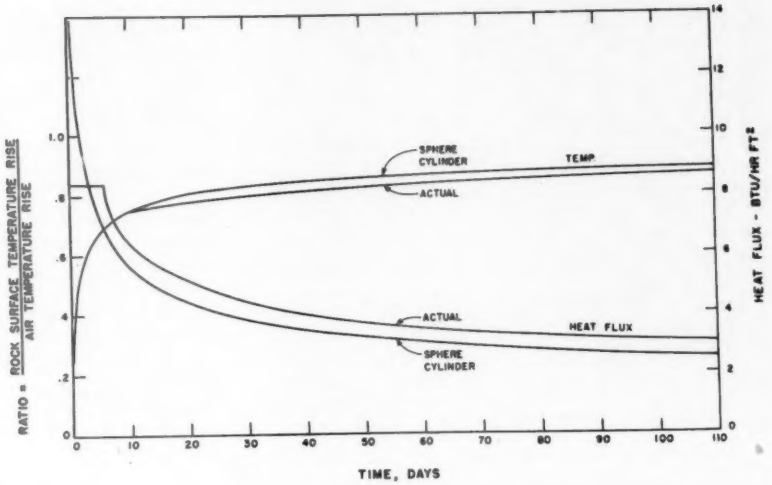
This "M.R." photograph shows the centre of the "top table" at last month's banquet of The Institute of Refrigeration at the Savoy, London. In the chair was Lieut.-Col. Lord Dudley G. Gordon, D.S.O., LL.D., President, left, and next to him is Major-General Sir Eustace F. Tickell, K.B.E., C.B., M.C., Colonel Commandant, Corps of Royal Engineers. At the right is Mr. C. M. Brain, Chairman of Council of the Institute. (*See also pages* 130 *and* 149.)

Basic Research into the Problem of Heat Transfer in Underground Chambers

SINCE World War II, much attention has been given to the use of natural or man-made caves by military, industrial, and civil defence groups for storage of goods or for shelter of personnel. One of the problems encountered is that of maintaining the space at a selected design temperature that may differ from that of the surrounding rock. When such an underground space is to be cooled or warmed to other than its natural temperature, heat transfer between the space and the earth must be considered under the transient conditions which exist. Heretofore, adequate data on the heat flow have not been available. To establish design criteria, scientists at the U.S. National Bureau of Standards have undertaken both theoretical and experimental approaches toward providing the needed information. The studies were recently carried out for the Office of the Chief of Engineers, U.S. Army, by B. A. Peavy of the bureau's heat transfer laboratory.

An analysis of heat transfer in underground chambers has recently been completed. The results provide a quantitative basis for predicting mathematically how much heating or air-conditioning a particular chamber will require to main-

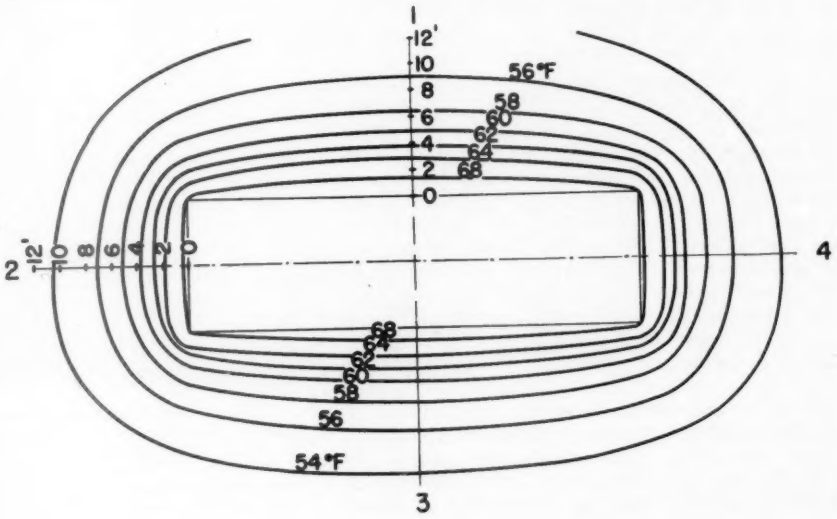




Graphical comparison of actual heat transfer over a period of time compared with results predicted from theoretical analysis.

tain a constant temperature. Subsequent experiments in an actual cave confirmed the range of accuracy of the mathematical solutions and supplied correction factors for representative chamber shapes.

The shapes of underground chambers approach those of hollow rectangular parallelepipeds. However, a mathematical solution for transient heat flow outward from a rectangular parallelepiped would yield expressions in three dimensions from which it would be troublesome to obtain numerical values. An infinite cylinder, or a sphere, may also be used to approximate the shape of a chamber, but the mathematical solutions obtained for these shapes are much more readily evaluated. The radius of an equivalent cylinder or sphere can be easily computed from the surface area of the chamber for which it is an approximation. Some departure of results calculated for these simple shapes from those of an actual chamber must be expected as a result of end, edge, and corner effects. Accordingly, experimental results were obtained in an actual cave to provide data for correction factors to make the mathematical solutions applicable to actual chambers with adequate accuracy.



Temperature distribution in rock after 521 hours.

For the experimental work, a chamber, 100 ft. x 35 ft. x 10 ft. high, was chosen. It was located a few hundred feet underground and remote from the surface in a horizontal direction. The thermal properties of the dense rock surrounding the chamber were determined at the bureau. Within the chamber, 385 thermocouples were installed at various locations in the air, on the rock surface, and at various distances in the rock to a depth of 12 ft.. Heat was added to the air by electric strip heaters mounted in the air ducts. The heat input rate was measured with watthour meters connected to the heaters.

Initially, the measured rock temperature was nearly uniform at 53.8 °F. After a constant heat of 8.4 B.t.u. per hour for each square foot of projected area of rock surface had been applied to the chamber for 139 hours, the temperature of the air reached 75° F. At this time, a thermostat began regulating the heat input to maintain the temperature at 75° F., and heat input was measured continuously for about 110 days, until sufficient data were taken.

The results of this and two similar experiments showed that the heat input necessary to maintain a constant temperature was slightly greater than that indicated by the mathematical solutions for the cylinder or the sphere. Correction factors based on the dimensions of the chamber were, therefore, formulated so that the mathematical solutions could be applied in a practical manner to caves of various shapes and dimensions. Numerical values of four mathematical functions needed for calculating the transient heat flow for the infinite cylinder and the sphere have been tabulated for a wide range of values of the independent variable. The independent variable contains time and size of chamber collectively.

Two Kamerlingh Onnes Medals to be awarded by the Netherlands Society of Refrigeration

CONTRARY to custom, in 1958 *two* Kamerlingh Onnes gold medals will be presented. The selection committee for the awarding of the K.O.-medal (chairman, Prof. C. J. Gorter) has recommended, and the society is happy to agree, that a second medal be granted.

First. To commemorate the first liquefaction of helium—in connexion with which an international conference on physics will be held this year at the Kamerlingh Onnes Laboratory in Leiden—to S. C. Collins, professor at the Massachusetts Institute of Technology, U.S.A. Dr. Collins was born in the United States in 1898 and studied agriculture at the University of Tennessee and physical chemistry at the University of North Carolina. His work on helium liquefiers using expansion engines and free expansion for very low temperatures resulted in a much improved machine which was also suitable for industrial production. Many of these liquefiers are now in use in research laboratories and as a result there has been a rapid growth in low-temperature research in America and many other countries. Dr. Collins was given the Franklin Institute medal in 1952 and received an honorary degree from the University of North Carolina in 1957. He will come to the Netherlands in June to accept the Kamerlingh Onnes medal in person.

Second. On the 50th anniversary (Sept. 23, 1958) of the Netherlands Society of Refrigeration, to the Physical Laboratory of the Philips Company at Eindhoven for producing a liquid air machine. This machine is the first efficient and economic one of its type and at the same time its yield is claimed to be greater than that of other small air liquefiers. Since it runs continuously, its output of liquid air is sufficient for even fairly large research laboratories and it is, therefore, in great demand everywhere.

New Companies

The accompanying particulars of New Companies recently registered are taken from the Daily Register compiled by Messrs. Jordan and Sons Ltd.

G.V.E. Ltd. To carry on business of refrigeration, mechanical and electrical engineers, etc. Capital : £100. Directors to be appointed by subscribers. Subscribers : R. Holt, 77, Buckland Way, Worcester Park, Surrey (audit asst.); L. A. Clark, 107, Park Lane, Croydon, Surrey (acct.).

Packer & Craven Ltd., 1, Victoria Street, Spalding, Lincs. To take over business of refrigerating engineers carried on as " J. Packer," at Spalding, Lincs. Capital : £2,500. Directors : T. J. Packer, 1, Victoria Street, Spalding (managing director) ; D. C. Craven, 6, Hartley Street, Boston, Lincs.

Bradley and Lomas (Refrigerators) Ltd., 175, Ecclesall Road, Sheffield. To take over business of refrigeration engineers etc. carried on at Sheffield by Peter Bradley and Harold Lomas. Capital : £500. Directors : P. Bradley, 132, Furniss Avenue, Dore, Sheffield ; H. Lomas, 42, Ashbury Drive, Sheffield, 8.

Road Transport of Refrigerated Products

A well-known designer's solution to the main problem

MR. R. SAUNDERS, of W. A. Taylor Ltd. has turned his attention to the hitherto baffling problem of the " ever open door " in road transport containers. Mr. Saunders's solution to this vexing problem, which is no less serious in the case of all insulated spaces where " service load " represents a major proportion of plant duty, is unique in that it wou'd appear to diminish heat exchange, due to exposure of a large opening at irregular and manifold intervals, to near vanishing point.

This is the special refrigerated body mounted on a Ford Trader chassis.

The chief problem of service load, which has puzzled designers of mechanical refrigeration as well as those who provide eutectics, is approaching the point where the losses can be calculated to a nicety, and equipment in these containers would appear to find a solution in mathematics rather than in hopeful guesswork.

After considerable development, the firm of W. A. Taylor Ltd., of Mitcham, which is under the control of Mr. Saunders, through the associated company, Thermal Closures & Containers Ltd., have constructed a pilot body which has been supplied to Mr. Horace Vigor, of Southern Frozen Products Ltd., of Brighton and Southampton, wholesale distributors of frozen foods and ships' suppliers, who, in co-operation with Mr. Saunders, are pioneering this new development.

The owner's equipment is designed for a load of approximately 3 tons, to be carried either as a mixed load for delivery to retail, catering, and institutional trades, or alternatively for collecting full loads from main cold store for delivery to the owner's own storage premises.

The most interesting feature of this most comprehensive piece of equipment, is the unique manner in which the entry of the operator is controlled and circumscribed, in order to minimize heat exchange due to air losses.

The delivery container, as we know it, has featured a normal door with, in some cases, the additional refinement of an inner door, and the intervening space of the airlock has, due to the need for a ruthless economy of space in order to

provide payload, been rendered impracticable and has lacked any form of control.

Mr. Saunders's " canopy," as he terms it, is a double closure in one, taking up very little room, and the operator may enter or leave without difficulty and, in the process, admits a strictly

Tail loading at the docks or main store is accomplished through this door.

limited air quantity, and exposes the inner to the outer zone for only a second or two.

This canopy form of entry, which has been placed on the patent file, is in combination with two other unique features, *i.e.* a " boot " which may be loaded from the inside with the equivalent of 9 to 10 drops in a retail delivery round of 70 or so calls. This makes it only necessary for the operator to enter five or six times under this rigid form of control, instead of 70 times with a door flapping open for indeterminable periods as hitherto.

The third feature, referred to above, is an interlocking device, which connects the access to the loading boot from inside the vehicle with the canopy, and effectively prevents the operator leaving the body without closing the loading hatches inside.

Unloading the boot is simplicity itself, and is effected through two service doors in the rear.

The rear doors are in two parts, the upper sections being hinged at the tops, and the lower sections having normally hinged doors, so that the load may be removed from two levels with the minimum of opening. The right-hand rear door is in line with an inner door, which passes through the boot into the main body, and is used for tail loading at docks or main cold store. Here again there is the same rigid control, in that until the inner plug which this operates is closed, the boot loading plugs cannot be closed, so that the bars are down and the operator cannot leave the body until this has been done.

An escape hatch is provided, to ensure that operators may get clear quickly in the event of trouble or illness, and this is placed in the floor immediately aft of the differential.

The insulation is, according to Mr. Saunders, designed to reduce losses from this source, taking into account solar build-up and heating up of the body during periods of disuse, with maximum economy.

Mr. Saunders's theory, underlying the design of this equipment, is that the majority of frozen products depend entirely on the latent heat of the ice content, and therefore the chief source of degeneration is by loss of latent heat, which can only be prevented by effective control as provided in this assembly.

It is obvious that with this real attack on the main problem of control, the solution to the refrigerating engineer's problem is in sight, and apart from the problem of loss rate due to air changes across the surface of the body in movement, the main problem would appear to have found a solution.

A licence for manufacture has been granted to Dawkool Bodies, Ltd., of Whitley Bay, with London offices at 3, Cork Street, W.1. This company will handle the entire marketing and distribution.

View in main compartment facing astern; this door cannot be opened until tail door is shut.

Correspondence

To the Editor-in-Chief,
MODERN REFRIGERATION,
London, S.E.1.

Fires in Insulated Cold Stores

Sir,—The recent disasters at Smithfield and in Cape Town highlight the question of insulation to cold stores related to fire risk, and will undoubtedly produce some wide, wild and varied ideas from a variety of quarters.

It is sad to think that these disasters will be regarded in certain quarters as an opportunity to further the interests of materials which are unsuited to commercial cold stores, and it is therefore necessary that the facts should be widely known as to what constitutes an efficient cold store, and how much of accepted procedure enlarges the fire risk without endowing the structure with any special properties thermally.

Parallel to this consideration is the factor of instituting sound methods, which, while reducing fire risk, do not reduce useful life and effectiveness, and will not raise cost, but rather tend to result in less cost.

The old methods involving the use of silicate of cotton or granulated cork between timber faces and framings does obviously pose a fire risk problem. Anything, in fact, which involves quantities of buried timber and timber faces is an added fire risk.

There has been a tendency in recent years to blame cork as an instance, and to classify cork insulated chambers as excessive fire risks.

There is bound up in such a conclusion an element of hastiness which would seem to indicate the lack of thorough comprehension of the problem.

No cold store can be constructed as an absolutely fire-proof structure, and still retain the essential elements of efficiency and stability indispensable to its function.

Attempts to use a wide variety of materials, some of which are said to be self-extinguishing when exposed to flame, and some of which are said to be non-inflammable, have now been widely discredited, in the sense that the main fire risk may not result from their immediate combustion, but the latent power of the fire to extend itself in other directions may be bound up in the very nature of the material, quite apart from its ability to resist fire in the initial sense.

For instance, there have been reports of a very serious fire in the U.S.A., which occurred in the roof of a large assembly plant, where the insulating material was rendered molten by the heat, and flowed into other parts of the plant, and ignited it against all the efforts of the fire-fighting units to prevent it.

Again, some of the so-called self-extinguishing materials are said to give off gases when ignited, which are not merely noxious, but are actually lethal, and in themselves involve a risk of spontaneous explosion.

These facts will serve to elicit the point that there is no short cut to a proper evaluation of fire risk applied to insulating materials, and the whole problem is one of some complexity.

In any consideration of the matter, it is necessary to examine the whole question of fixing materials, and especially the matter of bitumen.

Bitumen is a highly combustible and persistent burning agent, which will flow while burning, and fall on to the people concerned in fighting the fire.

The question of whether or not bitumen is an indispensable factor in putting up insulating material is well worthy of reconsideration, and the new science of low temperatures, coupled with the necessity to control the migration, and the ultimate destination, of water vapour in passage from one zone to the other, should be re-examined.

It is surely logical to conclude that, once water vapour has penetrated the outer seals, it should be permitted, and in fact encouraged, to pass on into the zone of low pressure, and find its way either on to the evaporator faces direct, or via the air stream.

It is contended that the use of bitumen originally resulted from a misconception, due to the relative rarity of low temperatures as we know them to-day, and that techniques and knowledge in those times were both relatively elementary.

It would appear that out of this re-examination of the old problem we become aware of the fallacy of using bitumen, and we may thus be enabled to do away with it, and to substitute something which will not impede the passage of vapour, but will constitute a very real resistance to the spread of fire.

Since the beginning of cold storage practice, it has been contended that cork, or any other material, should be set up in sand and cement on the lateral faces, and the edges should be dry butted. If this process is followed, and the finish is in a similar material, there is a high degree of resistance to fire, which is inherent in the first instance in a good three-coat cement rendering to the face, being at least $\frac{3}{4}$ in. thick, and likewise in the intervening layers, as a membrane of the same material, $\frac{3}{8}$ in. thick.

Another potent cause of fire spreading would also appear to be bound up in some fallacious thinking and practice, and I refer in this to the old idea that a dead air space is good insulation.

In point of fact, a dead air space not only constitutes the easiest possible means of fire spreading behind insulation to engulf the whole building, but as a form of insulation is completely negative, and can often result in excessive heat transfer, due to high-speed convection currents.

There is ample evidence in recent practice, that a cavity wall enclosing a cold store, unless thoroughly ventilated, results in excessive losses, and confers no benefits.

The fact, therefore, of these cavities requiring proper ventilation tends to negative their theoretical value from an insulation point of view, and the conclusion is that they may as well not be used.

Cavity construction is expensive, and there would seem to be no valid argument to encourage their further use, while the people concerned with fire-fighting will no doubt agree that the absence of cavities will make their task, in the event of serious fire, very much easier.

This opinion is not concerned with the causes of fire, which may result from bad electrical wiring, or lack of proper maintenance in switches and junction boxes, but it is at least fair to comment that many cold stores are fitted with types of insulated cable which will readily ignite in the event of short circuits, and the electrical people might well overhaul this technique, and the insurance companies could properly insist upon standards of protection inside cold store, not hitherto provided.

The foregoing comments are entirely related to fire risk, and should be read in that context.

Yours, etc.,

R. SAUNDERS,

January 31, 1958. W. A. TAYLOR LTD., MITCHAM.

IIR NEWS

COMMISSION III—LONDON CONFERENCE ON SAFETY CODE

A CONFERENCE of members of the sub-commission on the safety code of commission III of the Institut International du Froid was held in London from January 6 to 8 under the presidency of Professor P. Glansdorff, of Belgium. Delegates included Col. H. Randal Steward, U.K., past-president of the sub-commission ; M. R. Daval, France, also a past-president of the sub-commission ; Mr. W. S. Douglas, vice-president ; Mr. G. L. H. Bird, secretary, who made excellent arrangements for these meetings ; M. J. Passelecq, Belgium, " secretaire-adjoint " ; Dr. van Cube, Germany ; M. A. Gerard, Belgium ; M. G. Saint-Girons, France ; Mr. A. Kornfehl, Switzerland ; Mr. C. M. Brain, U.K. ; Mr. E. M. Heap ; Eng.-Cdr. W. R. Sinclair, U.K. Dr. J. C. Fidler, U.K., president of the technical board of the institute, was present.

Through the efforts of all delegates and the skilful direction of the discussion by Professor Glansdorff, definite progress was made in the work of arriving at a safety code. The preparation of a document, acceptable internationally, is a formidable task of drafting, in view of the need to bear in mind the content of existing national codes on refrigeration, the content of other codes for equipment incorporated in refrigerating plant (such as pressure vessels) and the fact that every word must be carefully chosen to ensure the precise meaning intended.

The progress of work on other matters was satisfactory ; a number of issues were clarified ; no decision was made, however, to proceed to any study by commission III of methods for numbering of refrigerants.

An outstandingly successful reception and dinner was given to the delegates by the British Refrigeration Association, while the proceedings were happily rounded off with a cocktail party given by the Department of Scientific and Industrial Research and a dinner by the Institute of Refrigeration.

Thanks were expressed to the governors of the Borough Polytechnic and the National College for Heating, Ventilating, Refrigeration and Fan Engineering for the facilities provided for the meetings and luncheons.

Key to illustrations on opposite page:—

1, Mr. W. S. Douglas, Institute of Refrigeration, Dr. B. K. Blount, D.S.I.R., the host, and Mr. J. A. Stonebanks; 2, Mr. E. M. Heap, York Shipley Ltd., and Eng.-Cdr. W. R. Sinclair, Lightfoot Refrigeration Co. Ltd.; 3, Dr. J. C. Fidler, D.S.I.R., Dr. R. W. Powell, N.P.L., and Mr. C. M. Brain, J. & E. Hall Ltd.; 4, Prof. C. A. Geneve, B.S.I., M. A. Gerard, Belgium, and Prof. P. Glansdorff, Belgium; 5, Col. H. Randal Steward, Inst. of Ref., and Mr. J. A. Brier, Inst. of Ref.; 6, Mr. G. L. H. Bird, Borough Polytechnic, and Mr. J. C. Taylor, Inst. of Ref.; 7, Mr. D. T. Lee, Inst. of Ref., Mr. S. B. Turner, Inst. of Ref., and Dr. A. J. Barnard, Inst. of Chem. Eng.; 8, Mr. T. A. Raymond, hon. sec., U.K., I.I.F., Mr. J. J. Beattie, D.S.I.R., and Mr. H. R. Howells, Lloyds Register of Shipping; 9, M. A. Gerard, Belgium, Mr. K. J. R. Cocke, Inst. of Ref., M. A. Kornfehl, Switzerland, and Mr. J. Douglas, Inst. of Ref.

The Xth International Congress of Refrigeration

Working committees now formed

AT a meeting in Copenhagen recently, held under the auspices of the organizing body for the Xth International Congress of Refrigeration in that city in 1959, namely Dansk Køleforening, the following committees were set up to prepare for the great event :—

1.—Organizing Committee

Mansted, S., director, A/S Atlas, Copenhagen.
Andersen, S. A., director, Køleteknisk Forskningsinstitut, Copenhagen.
Estrup, Frank, manager, Handelsministeriet, Copenhagen.
Gruhn, Axel, director, Thomas Ths. Sabroe, Aarhus.
Jul, Mogens, director, Slagteriernes Forskningsinstitut, Roskilde.
Mansa, J. L., director, Titan A/S, Copenhagen.
Meyer, K., director, Krystalisvaerket A/S, Copenhagen.
Meyer, L., Mrs., Copenhagen.
Pedersen, Anton, professor, Den kgl. Veterinaer —og Landbohøjskole, Copenhagen.
Schøler, M. F., chief engineer, Danfoss, Nordborg.

(*Continued on page* 142)

Refrigeration Engineers of International Repute at D.S.I.R. Reception

(*See opposite page*)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Sørensen, Svend, director, Nordisk Kulsyrefabrik A/S, Valby.

2.—Finance Committee

Meyer, K., director, Krystalisvaerket A/S, Copenhagen.
Bjørn, V., director, Evercold A/S, Copenhagen.
Hertel, N., director, Glent & Co., Valby.
Jepsen, A., director, Danfoss, Nordborg.
Lommer, Aage, director, Ths. B. Thrige, Odense.
Møller, I. C., director, Det Danske Kølehus Cold Stores, Copenhagen.

Mr. S. MANSTED, Chairman of the Organizing Committee.

3.—Papers Committee

Jul, Mogens, director, Slagteriernes Forskningsinstitut, Roskilde.
Andersen, S. A., director, Køleteknisk Forskningsinstitut, Copenhagen.
Bisgaard, F., professor, Danmarks tekniske Højskole, Copenhagen.
Bramsnaes, F., superintendent, engineering division, Fiskerimin. Forsøgslab., Copenhagen.
Christensen, Bendix, chief engineer, A/S Atlas, Lundtofte.
Christiansen, A., director, J. Lauritzens Rederi, Copenhagen.
Gram, Hans, engineer, Brødrene Gram A/S, Vojens.
Juel-Jørgensen, O., chief engineer, Teknologisk Institut, Copenhagen.
Korsgaard, A., director, Thomas Ths. Sabroe, Aarhus.
Kramhøft, O., director, Thomas Ths. Sabroe, Aarhus.
Mansted, S., director, A/S Atlas, Copenhagen.
Meyer, K., director, Krystalisvaerket A/S, Copenhagen.
Møller-Olsen, O., chief engineer, Danfoss, Nordborg.
Rasmussen, Edith, Husholdningskonsulent, Slagteriernes Forskningsinstitut.
Refslund, K., professor, Danmarks tekniske Højskole, Copenhagen.
Søgaard, N., chief engineer of D.S.B., Maskinafdelingen, Copenhagen.

4.—Publicity Committee

Sørensen, Svend, director, Nordisk Kulsyrefabrik A/S, Valby.
Friese, R., advertising manager, Danfoss, Nordborg.
Rysgaard, Jørgen, director, Det Jydske Kølehus og Isvaerk, Aarhus.

5.—Visits Committee

Gruhn, Axel, director, Thomas Ths. Sabroe, Aarhus.
Lønborg Frederiksen, P., secretary, Landbrugsrådet, Copenhagen.
Mathiessen, Chr., director, Danfoss, Nordborg.
Ørvad, H., chief engineer, A/S Atlas, Copenhagen.

6.—Hospitality Committee

Østbirk, E., sales manager, SAS, Copenhagen (alternate: J. Stilling, SAS, Copenhagen.)

7.—Ladies Committee

Mrs. Bisgaard, Copenhagen.
Mrs. Hertel, Virum.
Mrs. Jul, A. M. S., Roskilde.
Mrs. Meyer, L., Copenhagen.

New Ice Cream Depot.—A new 10,500-sq. ft. ice cream supply depot with cold storage facilities for 20,000 gal. of ice cream was opened by T. Wall & Sons (Ice Cream) Ltd., in Montagu Road North, Edmonton, North London, last month.

A link with the early history of The Institute of Refrigeration was severed last month with the death in Kenya of Lord Egerton of Tatton. The Rt. Hon. Maurice Egerton was the son of the late Lord Egerton of Tatton who was the first president of The Institute, in 1900, when it was known as The Cold Storage and Ice Association. The Rt. Hon. Maurice Egerton was a bachelor.

Electrolux's 1958 Range of Refrigerators

ELECTROLUX Ltd., makers of domestic refrigerators for over 30 years, announced their 1958 range of models last month. They enter 1958 with five models ranging from 3¾ sq. ft. to 14 sq. ft. of shelf area. All of these are of the silent, absorption type originated by this company. Two are new refrigerators, including the :—

Over 14 sq. ft. of practical shelf area is provided by the new Electrolux L.76.

Model L.37

The model L.37 can be said to bring luxury refrigeration to the modern home where the kitchen is perhaps on the small side and does not provide room for large appliances. This compact refrigerator holds an astonishing amount of food—it has a shelf area of 7¼ sq. ft. It is gracefully styled, beautifully appointed and attractively coloured in cream or white with ice-blue and gold trims. Its features include :—

A frozen storage compartment which can provide storage for as much as seven average-sized packets of frozen foods.

The "cold tray" beneath the frozen storage compartment provides suitable storage for uncooked meat or fish.

Four internal shelves, one fitted with a hinged flap providing room for an extra tall bottle . . . for example, a bottle of wine.

A "full-width" vegetable drawer to keep salad vegetables crisp.

Three adjustable door shelves . . . which are removable to facilitate cleaning.

Also incorporated in the door is a compartment for the storage of butter and cheese. (A butter dish is also included.)

The cabinet interior has a steel lining in white porcelain enamel.

Operation of this model, which is priced at 71 guineas, is by electricity or gas.

Model L.24

Model L.24 is a refrigerator which was scheduled for 1958 but which was brought forward to the market in September, 1957, when, due to the great demand, all stocks of the current year's model were absorbed by the trade by the end of July.

Its special attractions are :—

A shelf area of 5 sq. ft.

The other newcomer to the range is the L.37 which gives 7¼ sq. ft. of shelf area.

A newly designed silent absorption unit of even greater efficiency.

An ice compartment which will hold normal-size frozen food packets.

An attractive door-shelf arrangement for lager, lemonade and fruit juice bottles. There is also a rack for eggs.

A sturdy and resilient nylon door handle in a pleasant shade of ice-blue.

Something new for the housewife . . . the Electrolux tray top.

Attractive appearance in either white or cream with decoration in ice-blue.

Interior cabinet steel lining in white porcelain enamel.

Developed from a cabinet which had proved to be, according to the makers, the all-time best seller on the British domestic market, this first-class family refrigerator is within the reach of everyone.

Operation is by electricity, gas, bottled gas, paraffin, and the price : electricity and gas, 60 guineas ; paraffin £51 18s. 5d. ; bottled gas, £67 6s. 4d.

Electrolux " Traytop "

Available for use with models L.37, L.24—and the earlier model L.230—is the latest product from Electrolux—the *TrayTop*. The *Traytop* is an attractive, colourful tray which, when placed on top of the refrigerator, also serves as a working top. Easy to clean and durable, the *Traytop* is edged in white or cream to match the cabinet, with centre piece in heat-resisting Hardec in a choice of blue or red, to add a gay dash of colour in your kitchen. The *Traytop* is a separate purchase and costs 2 guineas.

Model L.76

This is another brand new model and the largest of the 1958 range, containing over 14 sq. ft. of practical shelf area. It is designed in the very latest styling in white or cream with the interior colour trimmed in ice-blue and gold. The interior is steel porcelain enamelled for easy cleaning. The frozen-storage compartment, which houses five ice trays, will also accommodate as many as 16 average-size frozen food packets. An interesting feature is the " draw-out " shelf which enables food to be taken from the back without having to re-arrange the loading.

An attractive Electrolux M.170 installation—built into the screen between kitchen and dining recess.

Refrigeration Controls—2

Fundamental Problems of Prime Mover, Transmission and Metering Sections of Controls

By H. H. EGGINTON

(*Continued from January issue*)

Prime Mover

ALL prime movers do work and the main problem in finding a suitable prime mover for any application is to effect sufficient output of work as a result of the change in conditions which the prime mover is measuring. This work, by operating through the transmission, effects the movement of contacts or the opening and closing of valves, and therefore the amount of work involved may be of quite considerable magnitude.

It will be appreciated from this that the sensitivity demanded from the control plays a very big

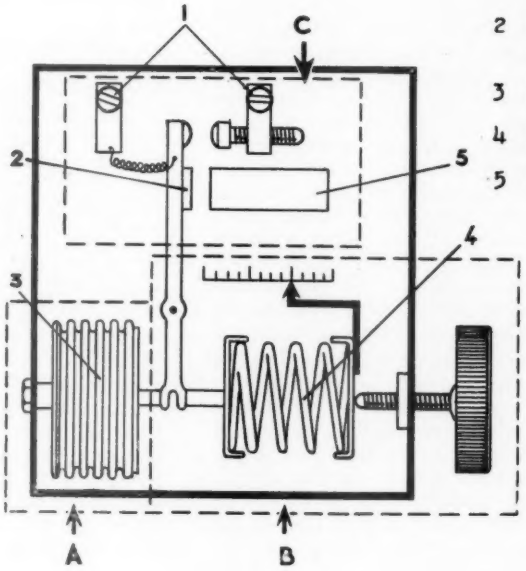
DIAGRAMMATIC THERMOSTAT

Principal Sections

A Prime Mover

B Transmission & Ranging Device.

C Metering Section (switch)



Details.

1 Terminals & contact assembly.

2 Switch Armature.

3 Bellows.

4 Range Spring.

5 Magnet.

Fig. 3.

part in selecting the prime mover, because if the output of work required is high, then a very sensitive prime mover may be needed to give this amount of work for a small change in conditions which it is measuring. It is this state of affairs which brings about the introduction of servo mechanisms by which auxiliary power is fed into the control. On the other hand, if the changing conditions are wide and this is acceptable in the degree of control needed, then the severity of selection of the prime mover is very much reduced. Other conditions which limit the use of prime movers and become fundamental problems in their selection are the extreme limits of sensitivity requirements, such as maximum and minimum pressures, maximum and minimum temperatures, humidities, etc., which in some cases become very significant at overload conditions, where the control responds quite satisfactorily to the normal conditions, but subject to extremes, causes damage and poor operation. This can happen with pressure controls where a great degree of sensitivity is demanded in the power element to respond to small changes in pressure, and then the control is also expected to withstand high overload conditions. This problem is extremely difficult to resolve without great complications in the prime mover. Nearly all prime movers have the characteristic that altering the force and movement output results in complication of sensitivity and as a result it is generally found that instruments of limited sensing range give high accuracy in that range and vice versa. In some temperature measuring devices this effect can be minimized when the prime mover utilizes liquid expansion. All prime movers show a degree of hysteresis, that is to say, lagging behind. In other words, they do not respond immediately to a change in conditions and this is particularly noticeable when the conditions reverse in direction, for example, when a rising pressure stabilizes and then begins to fall. As a simple illustration, if a flexible type of prime mover such as a diaphragm is made to move in one direction by certain pressure conditions and then these are reversed, there will be a small change in pressure whilst the prime mover in effect makes up its mind to go in the opposite direction. This hysteresis is fundamental to the material and varies with different materials.

Hysteresis affects sensitivity and ultimately becomes a fundamental part of the over-all accuracy of a control. In some prime movers another hysteresis effect is referred to as rate of response and affects accuracy by the ability of the prime mover to assimilate the changing conditions, such as a humidity sensitive element absorbing moisture or a sensitive phial giving up heat to the cooling air with which it is surrounded.

Time becomes a factor in these changes and therefore lagging behind occurs. Hence, a prime mover may have more than one source of hysteresis, depending on its complexity—the more complex it gets the more likely it is to have a large hysteresis characteristic.

Transmission

In transmitting the effort output from the prime mover, the principal problem is to deliver this output as a faithful representation of the change in the prime mover to the metering section of the instrument. In mechanical instruments the complication is friction and in electrical systems similar analogies exist. The complications are often introduced by inserting the ranging section of the instrument into the transmission members, so that the prime mover is opposed in some way and adjustable points of performance are obtained. In mechanical instruments these ranging devices usually contain springs and levers or push rods which give non-axial thrusts and hence introduce friction, or in other instruments electrical or magnetic effects alter the accurate transmission of the output of the prime mover. Such distortion is often referred to as hysteresis and, like that of the prime mover, becomes a fundamental part of the over-all accuracy of the complete instrument. Transmission hysteresis is generally more serious than other hysteresis forms because it tends to be erratic, resulting in erratic performance of the device as a whole.

Any slackness in linked parts of a transmission gives lost motion which is another source of hysteresis, because such slackness must be taken up before the transmission accurately repeats the movement of the prime mover. Such lost motion may be introduced into a mechanism deliberately to achieve a positive gap between metering on and off, such a gap being called differential on a switch, or throttling range in a valve mechanism.

Metering Section

As with the prime mover, the metering section of an instrument usually becomes basically concerned with amount of work — work to open and close contacts, move indicators, or open and close valve mechanisms, and the amount of work the metering section is itself capable of doing—passing electrical current, liquids or vapours.

As with all work, the requirements of any metering device can be specified as force "X" distance. For instance, a valve may need several pounds force over a distance of, say, an inch to completely open, and a switch may need an effort of several grammes through a few thousandths of an inch, but each require work to open and close.

One problem with valves occurs when the seat area is relatively large compared with the effective area of the prime mover, and in a closed condition of the valve there is a considerable difference in pressure between one side and another. This means that dependent on areas and the pressures, a considerable force may be required from the prime mover to open the valve, but once open the pressure drop across the seat will almost disappear and the valve will move rapidly to a more open position. Such a state of affairs means that a valve may open and close at different prime mover conditions as the pressure in the valve itself changes, which is rarely an acceptable state of affairs. To overcome such problems the valve area, and therefore load at a given pressure, is usually made small in relation to the prime mover thrust, or a double beat valve is used where two valve heads oppose each other and therefore there is little or no out-of-balance force due to pressure. The change of movement of the prime mover in terms of temperature or pressure required to take a valve from open to closed position or vice versa is known as the throttling range. Such movement contains the hysteresis of all the three sections and is clearly defined if a valve is taken from closed to open, back to closed position and back to open position, by finding the change required in the prime mover to move the valve and also to change its direction. Only such a review can clearly indicate the sensitivity of a valve.

Switches have identical analogies with valves except that the passage of electrical current has no effect on the opening or closing of the contacts as fluid pressure has on a valve.

They do, however, require force to keep the contacts in an open or closed position, particularly the latter, where the amount of electrical current which can be passed depends on the contact load or pressure as well as contact area and current-carrying mass. In changing the position of a switch this contact load has to be overcome. The switch may also have to break and make quickly to avoid arcing and this is achieved by storing up energy in the prime mover, transmission or the switch mechanism. Such storing means that changes are taking place in the prime mover which are not having immediate response in the switch and hence the switch differential, *i.e.*, the difference between opening and closing. As in the valve where this would be known as throttling range all the hysteresis of the three fundamental parts of an instrument adds to the differential.

Summing up, therefore—factors affecting sensitivity/throttling or differential are :—

(1) Range of the instrument.
(2) Ability of prime mover to sense change which in application may involve suitable positioning of sensitive part of prime mover.
(3) Power output of prime mover.
(4) Hysteresis, lost motion, friction, etc., of all three parts of an instrument.
(5) Power required by metering section.
(6) Over or undersize characteristics of valves to the requirements.

Hunting

Controls are applied in one of two systems, open loop or closed loop. In the former the changing conditions are sensed by the control but its action and the system which it is operating have no effect on the changing conditions. An example of such an open loop control system would be a master thermostat switching off a water chiller in cold weather ; the ambient temperature would cause the machine to be switched on and off, but the water chiller would have no effect on the ambient temperature. A thermostat applied to controlling the water temperature would be an example of a closed loop system. This thermostat would sense the water temperature and cause operation of the chilling plant, the plant then affecting the temperature of the water and in turn the thermostat. In a closed loop system, therefore, the parts of the system are dependent on each other, and there is a feed back of information to the controller.

All the forms of hysteresis or lag in response have the effect of making the control less sensitive in its ability to sense a change in conditions and produce the necessary amount of action in its metering section.

One might conclude from this that the complete elimination of hysteresis was desirable in all controls ; in fact, this is not the case. Open loop controls can be applied with a high degree of sensitivity and low hysteresis, *i.e.*, small over-all differentials or throttling ranges ; but closed loop systems can be erratic when controls of high sensitivity and low hysteresis are used. This erratic effect is known as hunting and causes a swing in the controlled conditions which can become violent if the control and associated machinery develop a combined rhythm. Most refrigeration controls are applied in closed loop systems and therefore the selection of a suitable control is very much a matter of degree of sensitivity. An insensitive instrument means a wide band of control but a too sensitive one can lead to erratic under-shooting and over-shooting of the desired requirements. In thermostats this means that for a given application a given differential is ideal, neither too fine nor too wide. In some cases the erratic performance of a fine differential thermostat can be avoided by introducing what is known as anticipating action.

In valves, the throttling characteristics which involve the design of the valve orifice, the pressure or temperature system rate and the overall hysteresis, are the most important factors in satisfactory application.

Valves produce the commonest form of hunting in refrigeration, and it will be appreciated that a valve which rapidly goes from a closed to fully open condition, as may be the case with an oversize valve, will alternately starve and flood. If these conditions become sympathetic with stopping and starting a compressor, then the overall refrigerating effect can swing violently. A less sensitive valve would meter gradually and ultimately give smaller changes in conditions. An even more insensitive control would give a wide band of conditions but generally the changes would take place slowly. The control in this instance may be appreciably better than with hunting conditions existent.

With very high sensitivity thermostats, even if hunting conditions are not produced, they can cause wear on machinery by repeated on/off switching and increased power consumption due to the frequent start loads.

(*To be continued*)

Bread Freezing in the West Country

MANY master bakers and students from Devon and Cornwall attended a baking industry's deep-freeze and refrigeration techniques lecture and demonstration held at the Lecture Theatre, Plymouth and Devonport Technical College, Glanville Street, Plymouth, under the auspices of the Plymouth and District Master Bakers' Association recently.

In welcoming the visitors, Mr. F. G. Northcott, president of the Plymouth Association, said that the Plymouth Association had accepted the kind offer of the Frigidaire organization to give the lecture-demonstration, and they had placed the full facilities of their organization at the disposal of the meeting.

There were four talks, "The need for bread freezing"; "What is bread freezing?"; "The freezer room and equipment" and "The commercial use and advantages of a bread freezer room," by two speakers from the Frigidaire organization in London, Messrs. W. O'Gorman and Peter Bedford. Also speaking on the subject and on the brains trust as well which followed the lectures was Mr. F. A. S. Abbott, managing director of Abbott Brothers (Western) Ltd., refrigeration engineers of Plymouth. Mr. Abbott has been a refrigeration engineer for some 35 years. Among his past successes was the design of what must have been one of the very first air-conditioning plants used in railway carriages in the tropics, and during the war he was closely associated with Dr. J. G. Davis in the study of the many problems involving refrigeration. In the west country he had also studied the problem relating to the production and handling of clean milk. His greatest achievement since the war has been the design of the very specialised equipment, which is used in the west country, in the Lincoln and Spalding areas and also in Holland; it is concerned with "the temperature treatment of flowering bulbs" and enables the flower growers to produce spring daffodils in time for Christmas.

Mr. L. J. Bowden, who is the head bakery contracts engineer of the Abbott business, has had 12 years' experience.

The next two gentlemen, Mr. S. Smith, of West Wickham, Kent, and Mr. Frank Mitchell, of Watford, are both master bakers; Mr. Smith has, since the installation of a deep-freeze room, considerably increased his turnover from £105 a week to £300, and £200 of this was counter trade. He has had his deep-freezer for 22 months and is fully conversant with it. Mr. Mitchell, who has had his deep-freeze room for nine months, has made some interesting experiments since having it installed. Both of these gentlemen were on the brains trust.

After all these gentlemen had given their views and experiences on the deep-freeze rooms in the baking industry, and many questions asked by those present, a small private dinner party was given for the guests at the Duke of Cornwall Hotel, Plymouth.

The Institute of Refrigeration Bulletin

Institute Headquarters: New Bridge Street House, New Bridge St., London, E.C.4 (CENtral 4694)

THE PRESIDENCY

The members of the executive council have much pleasure in announcing that Sir Rupert De la Bere, Bart, K.C.V.O., has accepted their invitation to become president of the Institute for the year commencing March 26, 1958.

APPOINTMENT OF VICE-PRESIDENT

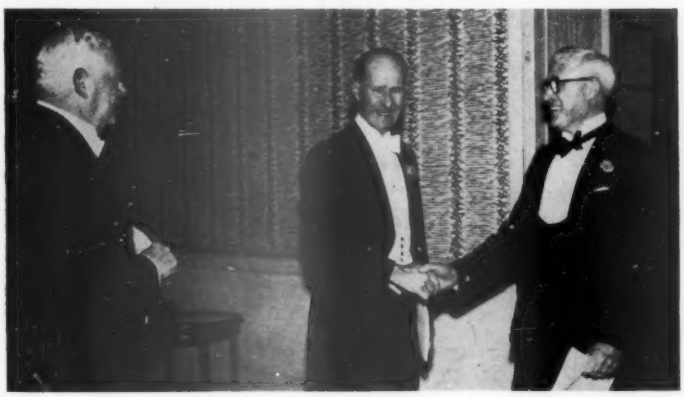
In recognition of the conspicuous service which Mr. W. S. Douglas, B.SC., has rendered to the Institute during the 37 years he has been a member, the council has appointed him to be a vice-president of the Institute. As members will no doubt recall, Mr. Douglas was president of the Institute from 1947 to 1949.

MARCH MEETING

A meeting of members of the Institute will be held at the Junior Institution of Engineers, Pepys House, 14, Rochester Row, Westminster, London, S.W.1, at 5.30 p.m. on Thursday, March 6, 1958, when Monsieur P. Vidal will present a paper on "Modern trends in cold store design and operation in France."

58th Anniversary Dinner

SIR RUPERT DE LA BERE, Bart, K.C.V.O., who is to be president during the coming year, proposed the toast of the Institute of Refrigeration at the Savoy Hotel last month in place of Sir Colin Anderson who was indisposed. In a characteristically light-hearted and amusing speech, he said that this was the fourth time he had been privileged to be a guest of the Institute at its annual dinner, the last occasion being in 1956, when he had proposed the toast of "Science and Industry." One of the other speakers at that time had been Sir Francis Simon, who had spoken on the theme of "Education and Research," and he had thoroughly agreed with everything Sir Francis had said. He



Lieut.-Col. Lord Dudley Gordon, D.S.O., LI.D., President, supported by Mr. Kenneth Lightfoot, O.B.E., Past-President, receiving guests.

had always felt that the Institute did excellent work ; if it had not, he went on, it would not have lasted for 58 years.

Consulting what he frequently and disparagingly described as his " brief," Sir Rupert said that he knew something of the ordinary techniques and applications of refrigeration and entirely agreed with the view that its impact had been wholly for good. In proposing the toast, therefore, he was thinking of the useful work of the Institute, which, although small compared with some other Institutions, had made itself felt in almost every land. Referring to the last international congress in Paris and the forthcoming event in Copenhagen, Sir Rupert said he well remembered his last visit to this latter city as Lord Mayor of London and, as a matter of interest, had been attending a conference in Paris at the same time as the last Congress was meeting.

In his response, the retiring president, Lieutenant-Colonel Lord Dudley Gordon, D.S.O., LL.D., said that before attempting to reply to the toast so excellently proposed by Sir Rupert, he wished to extend a very hearty welcome to the 600 people present, some of whom had had to be accommodated in an annexe. Sir Rupert had referred to the Institute as having gone from strength to strength, which was very true, but there were many people present who, although not members, were well qualified to join. He hoped that present members could persuade them to join the Institute, which he was sure would be of considerable benefit to them. It was usual on this occasion, he went on, to speak of the uses of refrigeration and he felt in this respect that, quite apart from technical developments, it was now more and more the case that the industry had to deal directly with human beings. He instanced, as examples of this, the uses of air-conditioning and the heat pump to cool and heat our bodies.

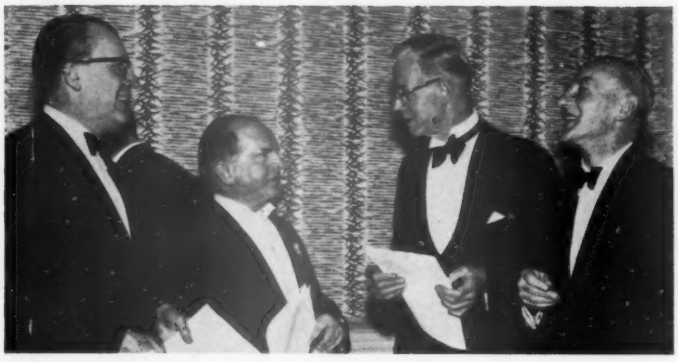
This was the second time he had had the honour of being president of the Institute ; on the first occasion it had been very small and was then known as the British Association of Refrigeration. He had led the Institute at two international conferences and he thanked members and colleagues for the very great assistance they had given him during the last two years. He was sure that the news that Sir Rupert de la Bere was to be his successor would be received with acclamation, and he drew attention to the fact that although previous presidents had been either manufacturers, scientists, or only remotely connected with the industry, Sir Rupert was unique in that he knew refrigeration as a user. In addition to this he had occupied many distinctive offices (he had been Lord Mayor of London and a member of parliament for 20 years) and he was, of course, a national figure. In conclusion, he wished Sir Rupert and the Institute every success in the future.

Proposing a toast to the guest, Mr. C. M. Brain, chairman of the council, said that he felt he should tell Sir Rupert that he followed a president who had been an inspiration both to the Institute and the council. He mentioned by name the many distinguished guests present at the dinner and went on to speak of the National College, which, he said, was no longer a struggling infant but a healthy adolescent turning out trained technicians. In view of the shock administered by the launching of the two Sputniks the need for new technicians was more important than ever. The government had proposed an expenditure of £80,000,000 and of this amount the Treasury had found £1,500 for the National College, which was 1/20th of 1 per cent. of that £80,000,000. He did not think any further comment was necessary.

In a witty reply to this toast, Major-General Sir Eustace F. Tickell, K.B.E., C.B., M.C., Colonel Commandant, Corps of Royal Engineers, referred to the important part refrigeration had played during the late war. With thousands of men needing hospital treatment, storage had been necessary for vaccines, sera, blood, etc., but the biggest problem had been food. It was no longer true, he said, that soldiers lived exclusively on tinned bully beef.

Mr. W. J. Beckway, Mr. R. V. Steel and Mr. Ken Jones.

Col. L. H. Fuller, Mr. D. P. Toomey.



Top left: Mr. T. E. M. Douglas, Mr. N. Westly, J. P. Walsh, J. C. Parker.

Top right: Mr. T. H. Alger. and Mr. G. Hunt.

Left: Mr. H. C. Brand, Mr. B. C. Oldham, Capt. W. H. Bunning, Mr. J. L. Baxter.

★

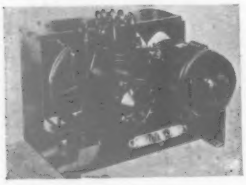
Left: Mr. J. C. Seabrook, Mr. R. Saunders.

Bottom left: Mr. R. J. Green, Mr. A. Mitton.

Below: Mr. John Still, Mr. Malcolm Young

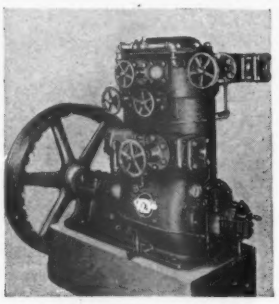
Mr. J. C. Taylor and Eng.-Cdr. W. R. Sinclair.

This group includes Mr. B. T. Smith, right, Mr. D. M. T. Smith, centre, Mr. S. Goodchild, second from left, and Mr. D. Mullaney and Mr. J. G. Lancaster.



COMMERCIAL AND INDUSTRIAL SECTION

Manufacturers' and distributors' news



It is learned that **Minikay Ltd.** have received an extremely valuable order from that very progressive company, Chambers Wharf & Cold Stores, Ltd., and their associated company, South London Cold Storage. The order is to supply Miniveil air curtains for all their cold room doors, which number nearly 70. Miniveils are now being used to protect the doorways of cold rooms in numerous industries, *i.e.* ice cream, fish, meat, vegetables, bakery, frozen foods, bacon curing, salmon curing, sausage manufacturing, handling rooms on ships, meat pies, etc.

* * *

The telephone numbers for the three companies of the **Distillers'** plastics group are now :—British Geon Ltd.—Hyde Park 7321. British Resin Products Ltd. and Distrene Ltd.—Hyde Park 0151, Formerly, all telephone calls for the above companies passed through one central exchange serving the various Distillers industrial companies occupying Devonshire House. The new arrangements will ensure that all telephone enquiries for the three companies receive direct and immediate attention by the companies' own staff through the newly installed exchange.

* * *

Mr. J. D. Roberts has been appointed assistant domestic sales

manager of Prestcold Refrigeration. He has been with Pressed Steel Co. Ltd. for many years and before joining the sales side some four years ago was one of the company's area service supervisors.

* * *

An adaptation of the Archimedean lift pump of antiquity has reappeared on the mid-20th century industrial scene in the form of the Goodyear pump produced by **Goodyear Pumps Ltd.** of Camborne, Cornwall, a subsidiary of Holman Bros. Ltd. The pump, which had its first public presentation last month, has borrowed the "screw" of the Archimedes pump and revolutionized this famous principle by the addition of one simple extra part. It has also incorporated the best of modern British design and precision engineering, and made use of the most up-to-date of synthetic rubber bonding techniques. The result is an all-purpose pump of outstanding performance. Three sizes of the pump (1¼ in., 1½ in. and 2½ in.

suction and delivery connections) requiring prime movers of from ¼ to 16 b.h.p. cover a range of outputs from 4½ to 167 gal. per minute against heads of from 50ft. to 200 ft. These performances will give an indication of the class to which these pumps belong. The 1½ in. pump, weighing a mere 11 lb. and of size 8 in. by 4 in. by 9 in., can deliver (at 3,000 r.p.m.) 31 gallons per minute against a 200 ft. head and requires a prime mover of 3.1 b.h.p. only. This single-stage pumping is in fact carried out at 61 per cent. efficiency. The Goodyear Pump is a continuous, self-priming, self-lubricating pump. It is a positive axial-flow unit employing a screw (rotor) of entirely new form. This screw engages with a rotating plate to produce a pulseless action that is virtually positive.

The latest addition to the range of seven service vehicles operated by Seldon and Company, Marco distributors, Guildford, is this Bedford van specially designed for work in the field. In the opinion of the firm, this type of body is the answer for service work, for besides being fitted with neat lockers for tools, a roll-over canopy gives protection to cabinets being carried. Messrs. Seldon's area is a wide one, stretching from Winchester up to Reading, south-eastwards to East Grinstead and down to the south coast.

SPECIALIZED REFRIGERATORS FOR BRITANNIA AIRCRAFT

FOR many months technicians at Lec Refrigeration Ltd. have been working on the exacting specifications demanded for the refrigerators to be installed by B.O.A.C. in their Britannia 103 and 312 and Comet IV airliners.

A dual temperature cabinet has been evolved of 8 c.ft. capacity divided into two refrigeration compartments, one for normal food storage and the other for frozen foods. The latter compartment will be capable of changing to normal food storage temperature for the return flights to Britain, when produce such as fruit will be stored instead of frozen foods.

Problems included the making of a large storage capacity in the smallest possible space, and having the lowest weight consistent with efficiency. The cabinets will be powered by units specially made for the electricity supplies available which are 112 volts for the Britannias and 28 volts for the Comets, both d.c.

B.O.A.C. have now placed an initial order with Lec for a total of 65 of these cabinets, delivery of the first batch to be made within a month.

" Recently much has been said about the costly time-wasting and the bottle-necks prevalent in the British aircraft industry, but we have found B.O.A.C. not only on their toes but extremely co-operative," said Mr. C. R. Purley, Lec managing director.

Lec is already manufacturing refrigerators for Israeli Airlines and recently installed a " special " in the aircraft of the United States Admiral in command of all American ships outside U.S. waters.

SHOP REFRIGERATION NEWS

VAST EXPANSION PROGRAMME AT SELFRIDGE'S

REFRIGERATED CHAMBERS SET A HIGH STANDARD

BEHIND the well-known and dignified facade of the Selfridge building, one of the landmarks of London's Oxford Street, there has been proceeding for several months now great constructional activity as part of the £1,750,000 development programme of this vast organization.

The accompanying illustrations depict the form of structure that will eventually straddle Duke Street and Orchard Street to the north of the main block, which includes an entirely new venture for Selfridges Ltd., a petrol station and multi-storage garage with accommodation for 1,000 cars in association with Lex Garages Ltd.

In the realm of transport facilities, the new building will be unique in that merchandise will be delivered and despatched below ground level, under cover, involving a series of ramps.

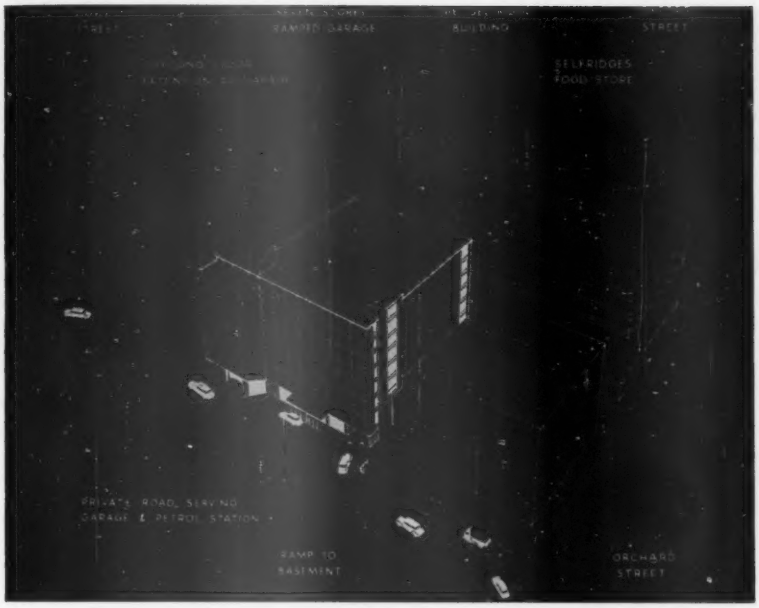
The very first part of this rebuilding project had to be the provision of new refrigerated chambers below ground level, for until these had been constructed a start could not be made on the major civil engineering work at the site. The refrigeration and cold chambers are now in operation.

The suppliers and builders of the refrigeration equipment, J. & E. Hall Ltd., regard the Selfridge perishable provisions storage section as one of the finest " commercial " installations in the country and those who have viewed the chambers and machinery rooms have been very impressed.

The refrigeration contract has involved the construction of nine built-in cold rooms complete with " Hallmark " equipment. Before a start could be made, considerable demolition work had to be put in hand for the old chambers had served their time.

The chief engineer of Selfridges, Mr. T. Young, O.B.E., M.I.E.E., having the backing of such a well-established organization, sets a standard for his mechanical and electrical engineering that is extremely high, and among the requirements that he laid down were long life of machinery, ease of maintenance of plant and cold chambers. He is satisfied that all his demands have been adequately met.

The first feature that immediately makes an impression on the visitor is the provision of a wide



Architect's drawing of the new extensions at Selfridge's.

SHOP REFRIGERATION NEWS

corridor (approximately 8 ft.) serving all nine rooms. It is also quickly noted that the refrigerant piping along this passageway is supported in an unusual way—in fact, on perforated metal shelves which makes any addition or alteration to the lines an easy matter. At this point one has a first glimpse of the fact that this installation is distinctly out-of-the-ordinary run, for such matters as pipe insulation has been given special attention ; the suction piping is insulated with cork shell throughout, set in bitumen and secured with copper wire. The cork is covered with semi-liquid adhesive Bitulac and then wrapped with linen tape with 1-in. overlap, the semi-liquid being brought over the surface to give a thin coating. The surface is then covered with anti-bleeding paint in three coats. The walls of this corridor are finished in white tiling which gives a most hygienic appearance.

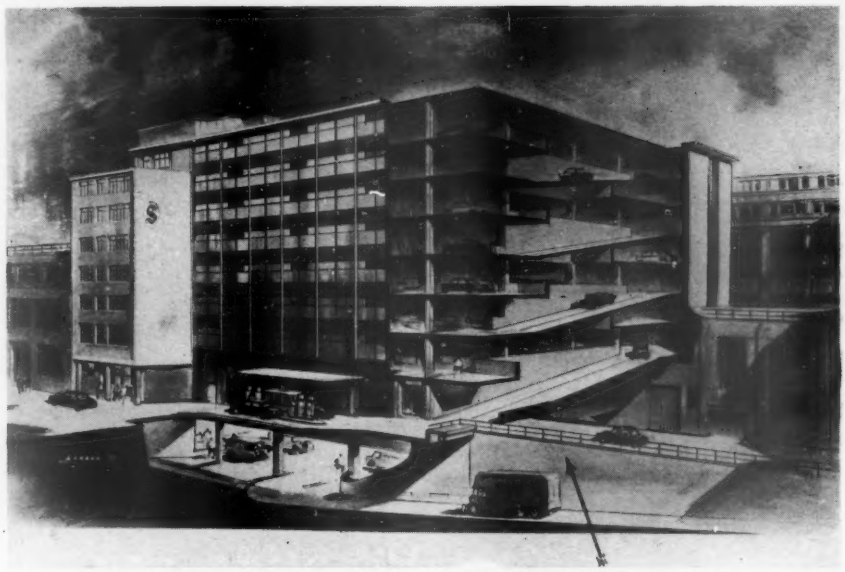
Incorporated below the floors of the low-temperature rooms are heating cables which prevent any possibility of freezing the subsoil. This consists of a Panelec heating unit having soft-iron-cored lead-covered resistance wires passing through aluminium tubing which is buried in a cement screed and looped back to an electronic controller. Thermostats are provided at intervals across the area connected to the controller and a multi-point temperature indicator is fitted to register the temperature below each floor.

Compressed cork slab has been used throughout for insulating the cold rooms while Canadian British Columbian pine was chosen for all joinery work. Floors are insulated with 6 in. of cork, in two layers of 3 in., while the ceilings of the provision, fruit, fish, meat and poultry chilling chambers have two layers of 2 in. cork ; the ceilings of the meat and poultry freezers have 6 in. of cork and those of fish and frozen foods holding rooms 8 in. The relative thicknesses for the external walls of these chambers are the same, while the dividing walls are 4 in. and 6 in. for the higher and lower temperatures.

All the rooms, with the exception of the wet-fish rooms, have walls and ceilings finished with " Eternite " sheeting bedded in " Otina " compound and secured with stainless steel screws and stainless steel jointing strips. In the fish room the walls are finished with a 4-ft.-high dado of 11-gauge galvanized sheet. Above this line, and up to the ceiling, the walls are finished with 20-gauge stainless steel sheeting, the metal being bedded in " Otina " compound.

In all the high-temperature rooms, the floors are finished with 1½-in. granolithic paving, incorporating " Quicksocrete " compound and having a surface filled with " Ironite," trowelled in after laying. In the low-temperature rooms, 1½-in.-thick granolithic flooring has been used, broken up into 3-ft. squares and having " Expandite " bitumen filler to all joints. The fish room is surfaced with 1½ in. of Limmer and Trinidad asphalt, incorporating in the surface cast-iron grids.

SHOP REFRIGERATION NEWS



Cut - away drawing showing location of stores and basement drive-in.

Cold stores are behind this wall.

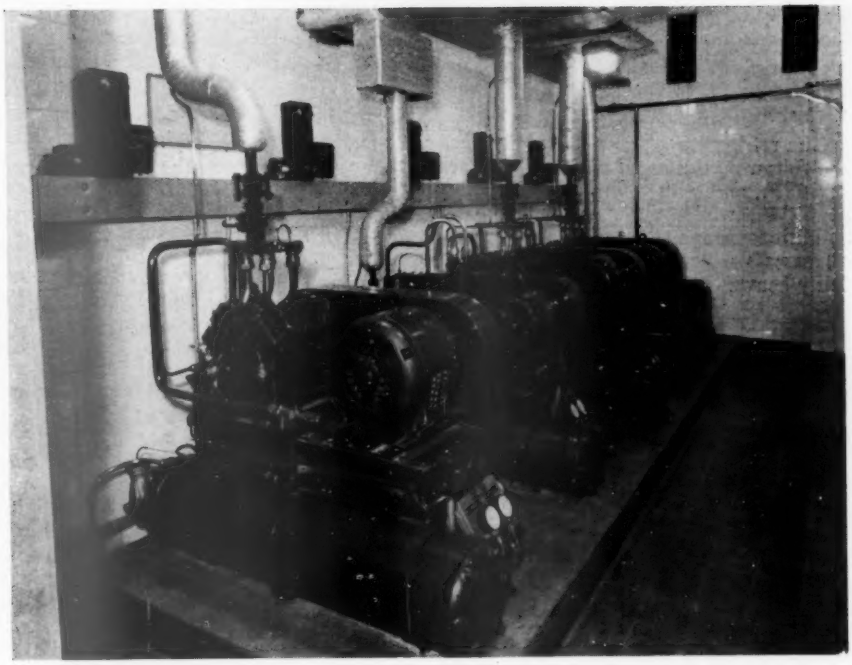
For access to all chilling rooms the doors are of the double rebated and gasketed type, having 4 in. of compressed cork slab insulation, all embedded in " Otina " compound. For the low-temperature rooms, the doors are of the super-freezer type, face-fitting and insulated with the same thickness of insulation as to be found on the wall in which they are fitted. To a height of 4 ft. the doors are lined with galvanized sheeting while above that height stainless steel is the lining material. All the super-freezer doors are fitted with Panelec low-voltage heating members.

In addition to the ceiling and side rails in these chambers, free standing, three tiers high, portable racks are provided for holding provisions. These were designed and fabricated by Hall's. These

Service passage for "frozen" and "chiller" stores. Note method of carrying refrigerant and other lines near ceiling.

SHOP REFRIGERATION NEWS

The high quality of the workmanship and the hygienic nature of the finishes employed are apparent in this illustration.



One of the two engine rooms of approximately equal size which would be hard to fault as regards layout and finish.

Frozen poultry storage room showing special racking made in standardized lengths.

racks are made in standard lengths of 5 ft. 6 in. and are fitted with slatted wood shelving.

It is interesting to note, after this brief description of the chambers, that there is no paintwork in the entire range of rooms and that all the exposed wood, such as the teak trims to the doors, has been finished with two coats of "Copal" carriage varnish.

The refrigerating plant is capable of performing the following duties with an ambient temperature of 80° F., and with water available for condensers at 65° F., whilst the running time under these conditions does not exceed 20 hours per day. In all cases the service load has been taken to be fairly heavy.

Duty

Provision Chilling. Maintaining a temperature of 33° to 37° F. for the storage of mixed provisions and in addition providing a margin of duty to cool 2½ lb. per c.ft. from 65° F., every 24 hours.

Fruit Chilling. Maintaining a temperature of 33° to 37° F. for the storage of mixed fruit and vegetables, and in addition providing a margin of duty to cool 2½ lb. per c.ft. from 65° F., every 24 hours.

Fish Chilling. Maintaining a temperature of 31° to 33° F. for the storage of wet fish and in addition providing a margin of duty to cool 5 lb. per c.ft. through a temperature range of 15° F. every 24 hours. Fish is packed in ice on entering the room.

Frozen Fish. Temperature here is maintained at −2° to +2° F. for the storage of frozen fish and in addition a margin of duty to freeze ½ lb. per c.ft. from 55° F. every 24 hours is provided.

Frozen Food. Maintaining a temperature of −2° to +2° F. for the storage of frozen foods.

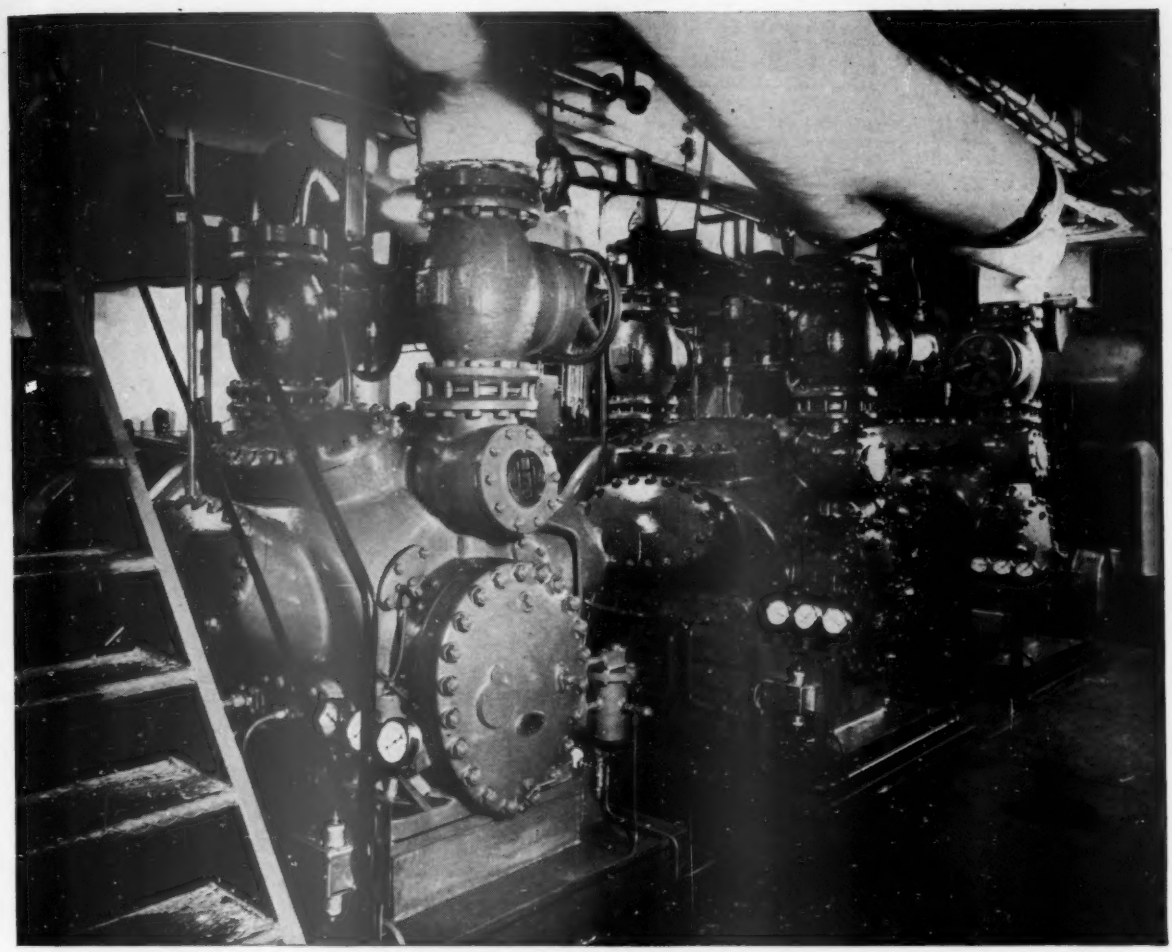
Frozen Meat. Maintaining a temperature of 13° to 17° F. for the storage of pre-frozen meat.

Meat Chilling. Maintaining a temperature of 33° to 37° F. for the storage of meat and in addition providing a margin of duty to cool 2½ lb. per c.ft. from 65° F. every 24 hours.

Poultry Chilling. Maintaining a temperature of 33° to 37° F. for the storage of poultry and in addition providing a margin of duty to cool 2½ lb. per c.ft., from 65° F. every 24 hours.

Frozen Poultry. Maintaining a temperature of 8° to 12° F. for the storage of frozen poultry and in addition providing a margin of duty to freeze ½ lb. per c.ft. every 24 hours.

One refrigerating machine has been provided for each cold room, it being of the reciprocating type, driven by V-belts, and having a water-cooled condenser. Each unit is complete with suction and liquid strainer, automatic oil separator and receiver. For the fruit and poultry chilling rooms, two 3CPM triple-cylinder machines, driven by 3-b.h.p. motors, have been provided, each with a multi-pass condenser. The fish and meat chilling rooms and the frozen meat room are handled by three 3CL triple-cylinder machines driven by 3-b.h.p. motors,



Refrigeration

J. & E. Hall Ltd., with seventy-five years of experience in the design and manufacture of refrigerating compressors and accessories; offer equipment ranging from small refrigerated cabinets with compressors of ¼ h.p. to large ammonia compressors requiring motors of several hundreds of horsepower. Today, over 65% of the refrigerated cargo space in the world's shipping is cooled by equipment of J. & E. Hall's manufacture.

J. & E. HALL LIMITED
DARTFORD · KENT

SHOP REFRIGERATION NEWS

with condensers of the shell and coil type. The frozen fish room is served by a 6CPM six-cylinder V-block machine, driven by a 7½-b.h.p. motor, whilst the frozen poultry, quick-frozen foods and provisions rooms are each handled by identical machines, driven by 5-b.h.p. motors, all fitted with multi-pass condensers.

Two coolers of plain steel galvanized pipe are installed in each room and have been arranged for transverse air flow ; each cooler is enclosed in a steel, galvanized casing.

All coolers incorporate water spray pipes for defrosting and are fitted with propeller and aerofoil type fans.

MANUFACTURERS AND SUB-CONTRACTORS

Main Contractors—J. & E. Hall Ltd.

In this bacon storage room, special attention has been paid to air circulation owing to protruding pillars; extensions have been added to the unit coolers.

Typical coolers in the vegetable holding room.

CONDENSER UNIT PROTECTION

Adequate supply of cooling water by the NEW

Teddington

'GK' WATER VALVE

- ★ COMPENSATES FOR VARIATIONS IN WATER PRESSURE.
- ★ COMPACT IN BUILD.
- ★ SIMPLE TO INSTALL.
- ★ FLEXIBLE DIAPHRAGM PREVENTS LOSS OF REFRIGERANT.
- ★ THOROUGHLY RELIABLE.
- ★ REFRIGERANT PRESSURES TO 250 p.s.i.

The new *Teddington* GK Water Valve is specially designed to pass an adequate supply of cooling water to the condenser, under strictly controlled conditions. The valve body is a hot brass stamping with ¾" B.S.P. female connections allowing, with adaptors, a wide range of connections to be made. The pressure bellows compartment is sealed by a synthetic rubber reinforced diaphragm. Highly flexible, this can withstand water pressures to 150 p.s.i., and also prevents loss of refrigerant. The opposing spring compartment is similarly protected against possible water entry. With the two diaphragms mounted at opposite ends of the spacer, changes in supply pressure will not affect the valve operation. Setting is adjusted by a handwheel. Well balanced, neat and compact in construction, the *Teddington* GK is easily installed and handled.

Teddington

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TR31

The poultry chilling room.

Compressors, air coolers, expansion valves, water valves, solenoid valves, etc.—J. & E. Hall Ltd.
Insulation work to chambers, doors, etc.—W. A. Taylor Ltd.
Electric Motors—Crompton Parkinson Ltd.
Fans—Woods of Colchester.
Control Gear—Crabtree Ltd.

Extended Works for Cabinet Manufacture

Craig Nicol Refrigeration, of Glasgow, have now completed the extension to their Niddrie Street Works to meet the growing volume of work which they are doing for the trade in Scotland and, in many instances, farther afield. While mainly concerned in the past with the production of tailor-made cabinets and systems for the industry Craig Nicol have been working steadily towards a reasonable degree of standardization which would allow batch production and so reduce production costs. The new layout has been carried through with this in mind and now permits them to tackle effectively short runs of standard jobs, and to apply mechanical handling methods where previously the work was largely man-handled. Although still a smallish unit by standards applying in the industry this plant has a flexibility and an experience which have been invaluable in meeting all the needs of many diverse sections of the industry and in its new development these needs have been kept in mind.

The main advantage is an increased capacity in the metalworking section for refrigerated display counter production and self-service fittings; latterly, Nicols have done a fair amount of self-service work, where that work involved refrigeration and they see in the developing self-service field a growing need for suitable equipment. They have also increased their storage accommodation by erecting a new floor, taking advantage of the roof space. This storage area allows clearance of the floor for production work which is now organised on work flow lines. Stacking trucks and pallets are used extensively throughout the line, allowing work to be handled with much greater ease than in the past. In effect, the extension has been designed to take the man muscles out of the job and put mechanical muscles in, and already this policy is paying off. Batch production is now being done on basic lines which are in demand for retail shop work. In addition, the plant has handled a very wide range of jobs from deep-freeze cold rooms for bakeries to self-service fixtures for meat—emphasizing again the flexibility which has been worked into the layout at this plant.

A recent introduction as a result of this development is a new 6 ft. serve-over counter which is being made for the trade, the "Popular."

Rocksil is *resilient* too

ROCKSIL—for either hot or cold insulation—has many important advantages to offer. Probably the most outstanding is its combination of strength with resilience—'rigid' resilience that absorbs impact and stands up well to considerable deflection of the surface it is protecting. In bonded slab form of various thicknesses and densities this makes Rocksil ideal for casing and structural insulation. It will not settle under continuous vibration even as loose infill. Rocksil is produced from natural Scottish rock and is odourless, chemically inert and sulphur-free, non-hygroscopic and rot-proof.

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Refrigeration for Fruiterers

By Our Special Retail Correspondent

RETAIL fruiterers' shops are by-passed by many—possibly even a majority—of the representatives of the makers or suppliers of refrigerated cabinets. The greengrocer, I am often told by these cabinet and cold room salesmen (each has his own favourite term of opprobrium) is dumb, smug, behind-the-times, unprogressive, pig-headed, old-fashioned, narrow-minded, and completely unresponsive to any advice on modernization. They then round off the condemnatory catalogue by adding : " He's had it."

But he hasn't, you know.

In substantiation of that statement, I have records of many individual fruiterers in all parts of the country who have modernized or are about to modernize their premises, and a majority of whom use refrigeration in one or more ways.

Many fruiterers are watching with more scepticism than anxiety the inexorable expansion of large-scale self-service and of its accompanying development, the selling in ready-wrapped form of the fresh produce that they themselves have so far been content to display naked and unashamed.

They feel that some kind of change is coming, that many of the smaller shops (though not theirs, of course) will be either absorbed or crushed out of existence by the giant trading concerns ; that change will be brought about so gradually that there is no need to worry ; that, anyway, there will always be a place for the small man who knows his business and whose customers know and trust him. A majority of them still hold the view that refrigeration is not necessary for the fruiterer who knows the trade and its seasonal fluctuations. If he is an experienced buyer, the highly perishable produce, such as salads, that he buys each morning in the market, goes in and out of the shop in the same day : there are seldom any left-overs.

I have not overstated the case on either side. But these collective views are generalities to

Continuing a line of displays on one side of the Bexleyheath branch of M. Ripley & Sons Ltd., is this Hussmann cabinet for unwrapped fresh produce.

FREEZING
STORAGE
DISPLAY

250,000 cu. ft. Frozen Food Store recently completed for Birds Eye at Great Yarmouth.

Lightfoot 15 stage Froster installed for Messrs. Macrae (D.A.) Ltd., Wholesale Fish Merchants & Curers, Hull.

D.D.F.F.4. Standard Display Case, an essential for all prepacked Frozen Food retailers.

The Lightfoot Refrigeration Co. Ltd., have specialised in the manufacture of all types of refrigeration machinery for over 70 years, and offer a wide range of equipment in standard sizes or to special requirements. Our illustrations of equipment designed for the Frozen Food industry give some idea of the comprehensive range we cover in this field.

LOW TEMPERATURE REFRIGERATION BY . . .

LIGHTFOOT
REFRIGERATION

THE LIGHTFOOT REFRIGERATION CO. LTD · ABBEYDALE ROAD · WEMBLEY · MIDDLESEX

SHOP REFRIGERATION NEWS

In the same shop a Frigidaire cabinet for quick-frozen foods is recessed into the wall-fixtures just beyond the counter.

Below is a close-up view of the Frigidaire q. f. f. cabinet recessed in between stock fixtures in Ripley's shop at Bexleyheath.

which there are important and encouraging exceptions. Many fruiterers who do not use refrigeration for their fresh produce and have no cooling facilities at the back do have a quick-frozen food cabinet. Quite a number who have no refrigerated displays do have a cold-room and the same applies in reverse. Those who have only one or the other have not yet been convinced that ideally one is a complement of the other : that produce kept in *store* under artificially cool conditions is preferably kept under the same conditions in the shop ; that produce sold from a cooling cabinet should preferably be replaced by produce drawn from a store of the same temperature.

The experienced and well-established fruiterer who buys in one of the central markets early every morning of the week, and who prides himself not only on buying the pick of the market but also on knowing to the uttermost radish what his sales of salads are likely to be each day, is seldom worried by the waste resulting from the deterioration of unsold stock. His customers accept his verbal assurance, supported by the evidence of their own eyes, that the lettuces are lovely and crisp, that the tomatoes are beauties.

It is almost a matter of principle for him to be resistant to the high-pressure salesmanship that tries to convert him, on grounds of economy, to the use of refrigeration, or to argue that with a refrigerated cabinet he can reduce his visits to the market to alternate days. His answer will be : " The first morning I miss the market, I shall miss something good." There is always that feeling that any break in the regularity of his visits will cause him to lose touch with market trends.

But to understand the point of view of greengrocers of this type, and to appreciate the pride

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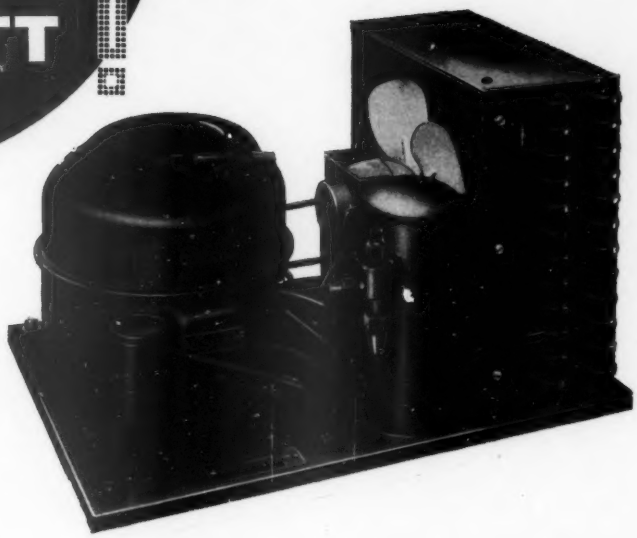

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SHOP REFRIGERATION NEWS

The refrigerated cabinet in Mr. J. B. Walker's shop at Chorley Wood is given up to salads and soft fruits. Behind Mr. Walker on the left is a Prestcold sub-zero cabinet.

they have in their ability to make critical selection at the market and accurate estimations of the day's sales in their shops, is not by any means tacitly to admit that for them the advantages of refrigerated display are doubtful. There are three sound reasons why they can benefit by using cooling media :—

1. Refrigerated display is used in *all* classes of food shops. Cabinets featuring salads and choice fruit under temperature controlled con-

In Mr. R. T. Riley's self-service fruit and vegetable shop at Heswall, salads are displayed on two refrigerated surfaces in a cabinet forming an integral part of the unit system of shop-fittings. The cabinet is at the back of the shop to facilitate replenishment from the preparing room.

(Salesmaster Shop-fittings, Ltd.)

SHOP REFRIGERATION NEWS

One of Exeter's new fruit shops, showing a q.f.f. cabinet on the right.

ditions make it evident that the fruiterer is not lagging behind the others.

2. Most large self-service stores and *all* the supermarkets have fully-representative stocks of fruit and vegetables, a proportion of which are ready-wrapped. So far only a minority of them are using refrigerated cabinets for this class of produce. By adopting this method himself the individual fruiterer is not only keeping abreast but a little ahead of these new giants of self-service, and thus preventing his customers from being drawn away from his shop by their more modern methods. No fruiterer who goes in for refrigerated display can be said to be behind the times.

3. Although there are still more homes in this country without refrigerators than those with, the number increases every year. Housewives who have their own refrigerators tend to expect the same standards of protection to be applied in the shops to all foods that are highly perishable.

But not all fruiterers can go daily to a central produce market. Many are too far away to follow a routine practice of early-morning buying every-day. For them a twice-weekly visit to the market may be the best that can be managed. Some more, remotely placed, have to rely on deliveries by wholesalers.

Fruiterers thus situated can produce no convincing argument against the use of refrigeration. It is the only means of avoiding a substantial loss of profit, through the wastage caused on the one hand by deterioration, or on the other through frequent shortages due to jittery buying from wholesaler or grower, because "the stuff won't keep." For these fruiterers, refrigerated display cabinets are the only alternative to the frequent showing of Brassicas or salads in a wilted, limp condition or soft fruits in a mushy state.

The shops and also the trading problems of these two classes of fruiterers are, for the reasons I have stated (and possibly for still more that I have not), worthy of the close study and contact of the sales personnel of the refrigeration industry. It is important, too, that they keep themselves informed of the progress made in the pre-packaging of fruit and vegetables, for, although at present most individual greengrocers are sceptical about the potentialities of this development, it *may* be forced on them by the fact that the large self-service stores are taking it up. It is, therefore extremely important to realize that refrigerated display becomes much more necessary when fresh produce is sold ready-wrapped, for, once a pre-packaged item takes on a stale or wilted appearance, it is virtually unsaleable : it cannot, like the uncovered products, be given an occasional freshening by spraying.

Looking back on the 70 to 80 individually-owned fruit shops that I have visited during the last 12 months, I find I can count on one hand those that are equipped with cabinets for the refrigerated display of fresh produce, on two hands those with cooling chambers ; but more than half of those visited have installed low-temperature cabinets for quick-frozen foods.

It is perhaps significant that three of the shops with cabinets for fresh fruit and vegetables are distinguished by other unusually interesting characteristics.

One of these is the Bexleyheath branch of the six-shop family-business of M. Ripley & Sons, Ltd. This has a 12-ft. Hussmann cabinet for fresh produce facing the main counter and a

Frigidaire q.f.f. cabinet beyond the main counter. The walls of this shop are faced with perforated hardboard in pastel tones and the positions of the two cabinets are emphasized by panels of lighter tint than the rest. The q.f.f. cabinet occupies space between two runs of shelf/bin fixtures and the pegboard panel behind it is used for displaying the price-lists and showcards of the processors whose products are sold from the cabinet.

In the shop of J. B. Walker (Chorley Wood), Ltd., there is a Hussmann cabinet for fresh produce running at right-angles to a distinctively designed counter, and it is easily seen from outside over a low and equally distinctive structure for window display. This shop carries on a dual business : the opposite side being given up to grocery and provisions, and the quick-frozen food cabinet forms part of a run of refrigerated cabinets in that section.

The shop of Mr. R. T. Riley at Heswall (Wirral Peninsula), one of the extremely few in this trade operating on self-service, has a refrigerated cabinet for salads against the back wall, though surprisingly enough, particularly in view of the fact that it carries so much pre-packaged fresh produce, it has no cabinet for quick-frozen foods. The cooled surfaces for the displays of salads are on two levels on what is probably the first refrigerated cabinet to be designed as an integrated and standardized part of a unit system of shopfitting. This refrigerated unit is self-contained, and the compressor housed in the back is accessible from the front by means of two sliding panels behind the lower of the two refrigerated displays. The top display level, a 1 ft. 3 in.-deep shelf, is not refrigerated. The two refrigerated levels, 2 ft. and 1 ft. deep, respectively, are held at a temperature of 30° to 40° F. There is a canopy at the top fitted with a fluorescent lamp which throws light down on the contents of the cabinet. It is a product of Salesmaster Shopfittings, Ltd.

A delightful fruit shop in the reconstructed area of Exeter, magnificently up to date in all but one respect, belongs to Hammett's Dairies, Ltd. It includes a Hussmann cabinet for quick-frozen foods ; but the appeal of the stock on the Shomore fittings is not reinforced by any other kind of refrigeration.

Another distinctive fruit shop, the attractions of which would be increased by the addition of a refrigerated cabinet for salads is that of Mr. L. Waghorn in the charming old Sussex town of Rye. The counter in this shop immediately faces the door and fitted into a splayed recess in the wall-fixtures which terminate on the left-hand side of the door is a Frigidaire cabinet for quick-frozen foods set off to advantage by a mirror-faced wall at the back, which also provides space for the display of processors' price-lists and showcards.

One of the most recent examples of a cooling chamber installed for a retail fruiterer is provided by a Prestcold installation for Outram, Ltd., Hampstead. This is of 450 c.ft. capacity.

Display Equipment in Cheshire

An attractive installation of Marco refrigerated display equipment has been made at the premises of Mr. R. H. Wood, 26, London Road, Alderley Edge, Cheshire, by Refrigeration (C. and N.) Ltd., 237, Oxford Road, Manchester, 13.

The installation comprises a 12-ft.-wide by 3-ft.-deep Marco, open-type, refrigerated window display with finned-coil evaporators in a coil bunker at rear of the display and evaporator tubing cooling the underside of trays ; the evaporators are equipped with automatic defrosting, the whole being operated by one G3-75 ¾-h.p. **Marco "Serviseal"** serviceable hermetic condensing unit maintaining temperatures of 32°/45° F. for fresh meats or mixed provisions, as required. The front vision glass has stainless steel corner trims and floor tray dished to two drain outlets. The interior of the display is finished in blue. The top of the coil bunker has a 12-ft. by 9-in. by ¾-in. marble serving shelf. The window display is equipped with fluorescent lighting. Additionally, the interior view of the shop shows two 6-ft. **Marco "Marquis"** all-purpose counters in line with marble serving shelves, one 6-ft. length being for the display and storage of quick-frozen produce, maintaining zero to +5° F., the other 6-ft. length maintaining a temperature of 32°/45° F. for fresh meats or mixed provisions, as desired. The evaporator system is of the forced-air type equipped with automatic defrosting, the low-temperature counter being operated by a ¾-h.p. **Marco "Serviseal"** serviceable hermetic condensing unit and the medium temperature model by a ½-h.p. unit incorporated in the counters.

The U.S. Air-Conditioning and Refrigeration Exposition at Chicago—II

THE very obvious success of this once-every-two-years event led to an immediate announcement about the next one. It will be held in Atlantic City, New Jersey, late in 1959 or early in 1960.

Among the exhibitors, the White-Rodgers Company, of Missouri, announced a new and improved ice bank control (type 16A35-12) designed specifically for longer compressor " off " cycles in milk cooler operation. By virtue of a new sensing element, this achieves a higher degree of sensitivity than any previous ice bank control manufactured by the company.

In general practice, the control is used to regulate a compressor to maintain an actual bank of ice to a desired thickness. The bank itself functions as a means to store refrigeration. This principle finds wide application in items such as milk coolers, refrigeration cabinets, etc. The success in refrigerating with this principle lies in controlling the thickness of the ice bank. In the case of the new White-Rodgers appliance, this thickness can be regulated to an accuracy of 1/16 inch.

The new sensing element holds the key to the control's improved performance. It incorporates a stainless steel cup containing two steel diaphragms that form inner and outer fill chambers. The outer chamber is filled with water and hexagonal silver iodide crystals. It is the freezing of this water which exerts a force upon the inner diaphragm and the transmitting medium.

The new power-operated horizontal sliding door, called the " Electroglide," was exhibited in its prototype form by its manufacturer, the Jamison Cold Storage Door Co., of Maryland. Experimental testing of the door has indicated that installations should be possible by the spring. The features of this new development include " Frostop," an automatic heating cable which prevents freeze-up. Also on show was the company's " Flexidor," a neoprene batten door that permits the passage of hand and power trucks without damage to the door (fig. 1).

Claimed to be a new concept in refrigerated display cases, " Flexicold " was introduced to the refrigeration industry at the exposition by the Sherer-Gillett Company, of Michigan. These cases—the " Flexicold Spot Islander " and the " Flexicold Spot Merchandiser "—are available in a variety of models and in either 5-ft. or 8-ft. lengths. The units make it possible for the food market operator to select the correct temperatures for foods, with a simple turn of a dial. The temperature range may be so regulated from −10° to +44° F.

According to the company, the grocer may now arrange his displays, using the same cases in accordance with the season. For example, in the summer he might stock the merchandiser with frozen lemonade or ice cream, while in the autumn and winter, he can display " specials " or " leaders " in the packaged, fresh or luncheon meat, dairy product, or produce lines (fig. 2).

Among the long line of appliances introduced for the first time by the Airtemp Division of the Chrysler Corporation, was a 1-h.p. casement

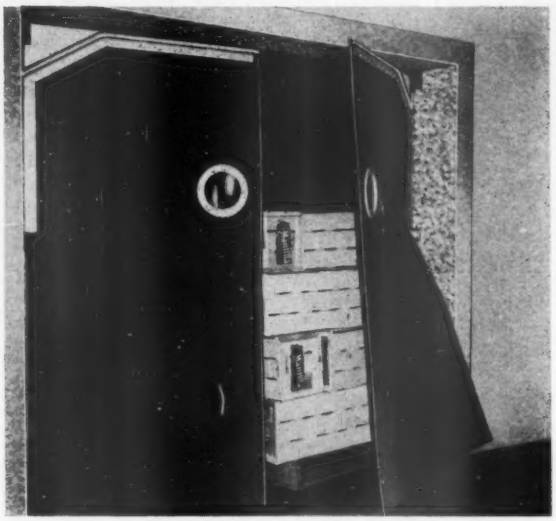

Fig. 1.

window room air-conditioner. The cabinet is finished in soft beige—a colour arrestingly complemented by an apron of silver charcoal that extends beneath the unit's control panel. The large grilles can be adjusted for four-way directional air control. The conditioner mounts like a screen and requires neither pane removal nor window alteration. With the conditioner in place, the window can be opened or closed.

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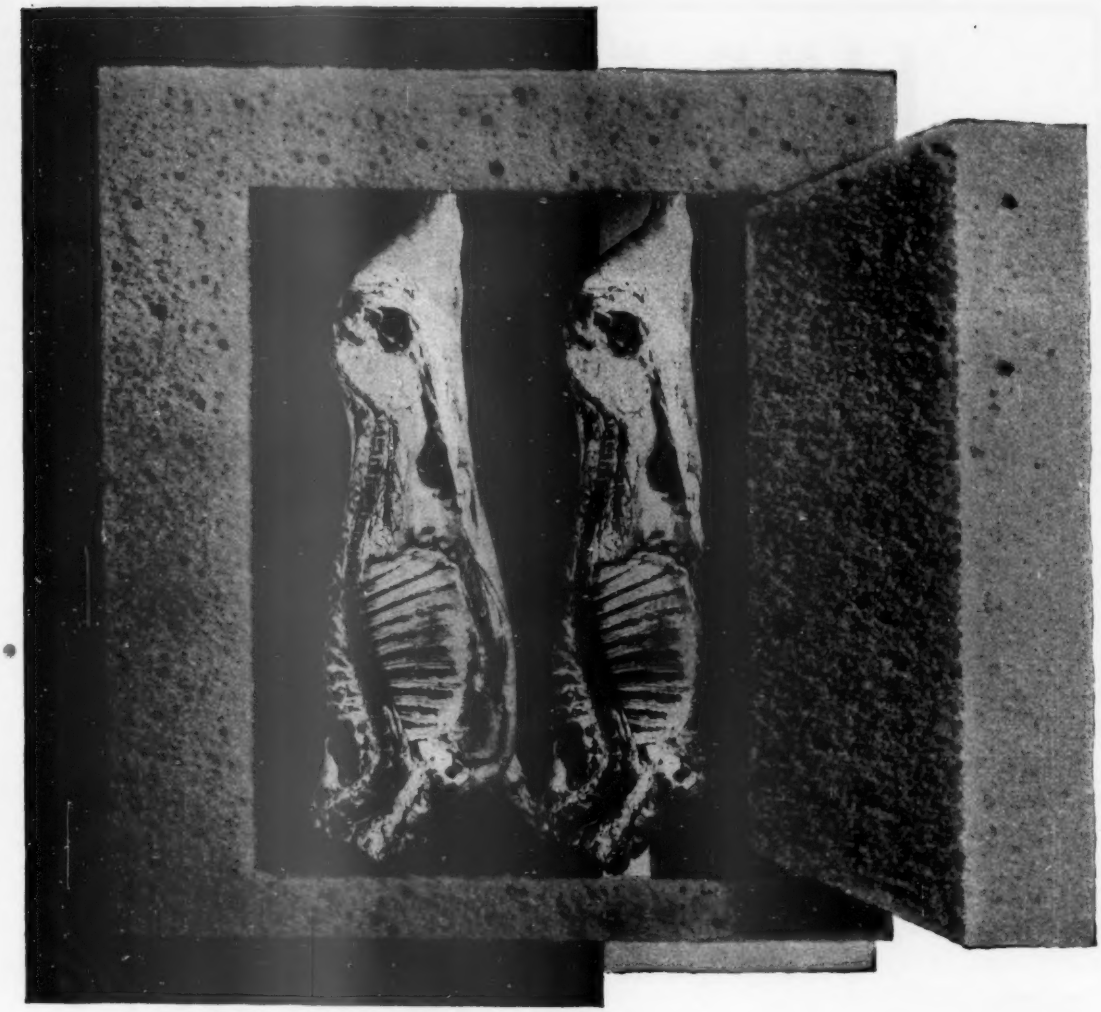

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polystyrene, was exhibited by the United Cork Companies. Measuring 12 ft. by 4 ft. by 8 in., the product was " Uni-Crest," an expanded and expandable polystyrene. Its very low " K " factor, coupled with lightness of weight, ease of installation and inexpensive cost makes it an ideal material for low temperature insulation. As officials on the companies' stand pointed out, " Uni-Crest " is finding widespread acceptance for refrigerators, air-conditioners, refrigerated truck bodies, and railway wagons.

The product is now available in moulded slab or block form as well as in " bead " condition. The United Cork Companies, for long leaders in the manufacture and engineering of cork insulation, formed the " Uni-Crest " Division in 1956. Since then, a modern $1,000,000 " bead " plant has been built in New Jersey and new moulding plants are being planned.

Described as a " revolutionary " electrostatic filter that " literally plucks dust, smoke and pollen from the air and makes all other filters obsolete " was a main attraction on the Lonergan Coolerator Division's stand. A reverse cycle heat pump, a new 65-lb. portable air-conditioner that a housewife can install, were also announced by the firm as soon as the exposition opened.

The filter, to be known as the " Lectrofilter," does not trap particles in holes but pulls even the tiniest particles like a magnet to the filter. Washable, the filter has its own generator powered by airstream and does not produce ozone. Moreover, it is offered at no extra cost on every custom room-air-conditioner and is optional on all central conditioners.

How models made by the Gibson Refrigerator Co. (fig. 3) used " Rubatex " was a main theme of the stand taken by the Rubatex Division of Great American Industries Inc. The material is employed

Fig. 3.

in the making of 19 separate unit parts for Gibson models. Officials of the company stressed that the role of " Rubatex " is very important in that

Fig. 2.

Gibson units take up to 12 gal. of moisture from the air daily. Were a less effective sealing agent used, leaking inside the room and dripping down the side of the building would result (fig. 3).

Fig. 4.

A completely new line of residential air-conditioning controls was introduced at the show by the Minneapolis-Honeywell Regulator Company. Included were an automatic two-stage heating and cooling thermostat, a refrigeration pressure control and a series of air-conditioning control panels.

The new thermostat is the result of four years of Honeywell research and engineering and six different models are available which provide every type of heating and cooling control—manual, semi-automatic, and completely automatic changeover. There is separate heating and cooling circuitry which simplifies add-on installation of either heating or cooling (fig. 4).

The stand taken by the Metals and Controls Corporation showed the newest addition to the Klixon line of sealed controls for air-conditioning and refrigeration applications. Styled the 20220 thermostat, one immediate application is to prevent freeze-ups in air-conditioning units by cycling the compressor directly when frost forms on the evaporator or coils. Two existing problems in the air-conditioning industry can therefore be solved, declare the manufacturers : reduction of component dimensions, resulting in the cutting down of over-all dimensions ; and increased compressor capacity without the danger of freeze-ups.

HOWARD FOX

REFRIGERATION PATENTS

These new refrigerating patents have been specially selected for readers by MODERN REFRIGERATION from the Official *Journal of Patents*, and are published by permission of the Controller of H.M. Stationery Office.

APPLICATIONS RECEIVED

November 29—Unilever Ltd., Revel H. J. de L. Knight, P37325, Refrigerating Apparatus. December 2—Westinghouse Electric International Co., C37459, Refrigeration apparatus gaskets apparatus. 11—Ross, A. J., C38528, Ice-making machine. 13—Dole Refrigerating Co., C38797, Freezers ; Westinghouse Electric International Co., C38779, Refrigeration gaskets, etc. 18—Pellizzetti, I., C39367, Air-conditioner ; V. D. M. Spinners Ltd., Barnes, N. J., Burton, P., and Ravenscroft, G. S., P39406, Refrigeration systems. 20—Garrett Corporation, C39676, Refrigerant compressor seal. 24—Drayton Regulator & Instrument Co. Ltd. and Grover, R. V., P40105, Temperature control apparatus. January 1—Miller Insulation & Engineering Ltd., McClement, B. M., P46, Refrigeration chambers doors. 2—General Motors Corporation, C159, Ice-block making arrangements ; C160, Ice-block release arrangements.

COMPLETE SPECIFICATIONS ACCEPTED

December 18—General Motors Corporation, 790,743, Manufacture of refrigerators. January 2—General Motors Corporation, 791,270, Refrigerator apparatus, Armour & Co., 791,507, Refrigeration of animal carcase. 15—Mundean Manufacturing Co., 791,848, Refrigerating system.

Frozen Foods is obtainable from the manager, Maclaren House, 131 Great Suffolk Street, London, S.E.1, at fifteen shillings per annum, post free to any part of the world.